SL-HF2000
RMT-V128

SERVICE MANUAL

US Model
Canadian Model

SuperBetahi-fi

SPECIFICATIONS

System

Format	Beta Hi-Fi system
Video recording system	Rotary two-head helical scanning FM system
Video head	Two heads
Video signal	NTSC color, EIA standards
Tape speed	Ⅰ/ⅡS: 4.00 cm/s (1 5/8 inches/s) (Playback only) Ⅱ: 2.00 cm/s (13/16 inches/s) Ⅲ: 1.33 cm/s (17/32 inches/s)
Maximum recording/ playback time	5 hrs in Ⅲ mode (with L-830 tape)
Fast-forward and rewind time	Within approx. 4 min. (with L-500 tape)

Tuner Section

Channel coverage	VHF channels 2 to 13 UHF channels 14 to 69 CATV channels A-8 to A-1, A to W, W+1 to W+84
Antenna	75-ohm antenna terminal for VHF/ UHF

Inputs and Outputs

LINE IN	VIDEO IN 1 and 2 (phono jacks) Input signal: 1 Vp-p, 75 ohms, unbalanced, sync negative AUDIO IN 1 and 2 (phono jacks) Input level: –7.5 dBs (0 dBs = 0.775 Vrms) Input impedance: more than 47 kilohms
LINE OUT	VIDEO OUT (phono jack) Output signal: 1 Vp-p, 75 ohms, unbalanced, sync negative AUDIO OUT (phono jacks) Standard output: –7.5 dBs at load impedance 47 kilohms Output impedance: less than 10 kilohms

Timer Section

Clock	Quartz locked
Time indication	12-hour cycle
Timer setting	Only for recording 8 programs in one month at max.
Power back-up	Built-in self-charging capacitor Back-up duration: Up to one hours at one time

—Continued next page—

Beta
VIDEO CASSETTE RECORDER

SONY

General

Power requirements	For USA and Canada: 120 V AC, 60 Hz For other countries: 110 V – 240 V, 50/60 Hz, automatically adjusted
Power consumption	For USA and Canada: 24 W 10.5 W (in standby condition) For other countries: 24 W 10.5 W (in standby condition)
Operating temperature	5°C to 40°C (41°F to 104°F)
Storage temperature	–20°C to 60°C (–4°F to 140°F)
Dimensions	430 X 108 X 359 mm (w/h/d) (17 X 4 3/8 X 14 1/4 inches)
Weight	6.5 kg (14 lb 5 oz)

Wireless Commander RMT-V128

Remote control system	Infrared control
Power requirements	3 V DC, 2 size AA batteries (IEC designation R6)

Accessories Supplied

Wireless Remote Commander RMT-V128 ..... (1)
Size AA (R6) batteries ..... (2)
75-ohm coaxial cable with F-type connectors ..... (1)
External antenna connector ..... (1)
AC power cord ..... (1)
Audio/video connecting cable (3 phono to 3 phono) ..... (1)
Video head cleaning cassette ..... (1)
AC plug adaptor (only for other-country model) ..... (1)

Design and specifications are subject to change without notice.

SAFETY CHECK-OUT

After correcting the original service problem, perform the following safety checks before releasing the set to the customer:

1. Check the area of your repair for unsoldered or poorly-soldered connections. Check the entire board surface for solder splashes and bridges.
2. Check the interboard wiring to ensure that no wires are "pinched" or contact high-wattage resistors.
3. Look for unauthorized replacement parts, particularly transistors, that were installed during a previous repair. Point them out to the customer and recommend their replacement.
4. Look for parts which, though functioning, show obvious signs of deterioration. Point them out to the customer and recommend their replacement.
5. Check the line cord for cracks and abrasion. Recommend the replacement of any such line cord to the customer.
6. Check the B+ voltage to see it is at the values specified.
7. Check the antenna terminals, metal trim, "metallized" knobs, screws, and all other exposed metal parts for AC leakage. Check leakage as described below.

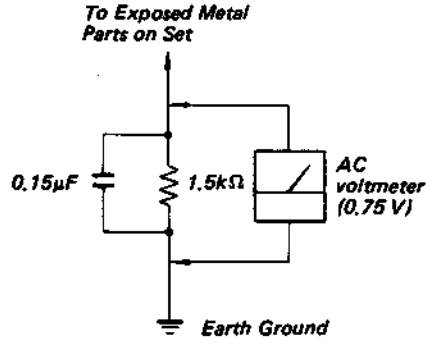


Fig. A. Using an AC voltmeter to check AC leakage.

LEAKAGE TEST

The AC leakage from any exposed metal part to earth ground and from all exposed metal parts to any exposed metal part having a return to chassis, must not exceed 0.5 mA (500 microampers). Leakage current can be measured by any one of three methods.

1. A commercial leakage tester, such as the Simpson 229 or RCA WT-540A. Follow the manufacturers' instructions to use these instruments.
2. A battery-operated AC milliammeter. The Data Precision 245 digital multimeter is suitable for this job.
3. Measuring the voltage drop across a resistor by means of a VOM or battery-operated AC voltmeter. The "limit" indication is 0.75 V, so analog meters must have an accurate lowvoltage scale. The Simpson 250 and Sanwa SH-63 Trd are examples of a passive VOM that is suitable. Nearly all battery operated digital multimeters that have a 2 V AC range are suitable.
(See fig. A)

SAFETY-RELATED COMPONENT WARNING!!

COMPONENTS IDENTIFIED BY MARK ⚠ OR DOTTED LINE WITH MARK ⚠ ON THE SCHEMATIC DIAGRAMS AND IN THE PARTS LIST ARE CRITICAL TO SAFE OPERATION. REPLACE THESE COMPONENTS WITH SONY PARTS WHOSE PART NUMBERS APPEAR AS SHOWN IN THIS MANUAL OR IN SUPPLEMENTS PUBLISHED BY SONY.

ATTENTION AU COMPOSANT AYANT RAPPORT À LA SÉCURITÉ!

LES COMPOSANTS IDENTIFIÉS PAR UNE MARQUE ⚠ SUR LES DIAGRAMMES SCHÉMATIQUES ET LA LISTE DES PIÈCES SONT CRITIQUES POUR LA SÉCURITÉ DE FONCTIONNEMENT. NE REMPLACER CES COMPOSANTS QUE PAR DES PIÈCES SONY DONT LES NUMÉROS SONT DONNÉS DANS CE MANUEL OU DANS LES SUPPLÉMENTS PUBLIÉS PAR SONY.

Hookups and Getting Started

Before you can use your VCR for the first time, you need to connect it to your TV and set it up to receive programs for viewing and recording. This section explains how to hook up, set up, and operate your VCR so that you can start enjoying it right away. There are, however, many types of TVs available and many different ways in which your TV can be hooked up. As a result, this manual describes several ways your VCR can be connected.

To hook up your VCR so that it works best for you, first scan through this section to find the diagram that best illustrates the way your TV is currently connected (antenna or cable/cable box). Then use the accompanying diagrams and procedures to complete your VCR's connections.

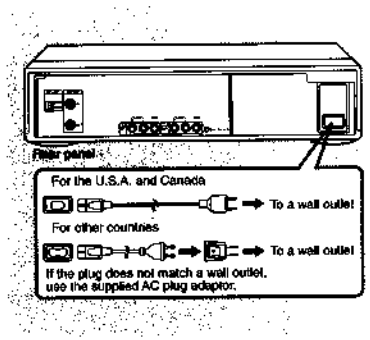
After you've completed the connections, follow the instructions for setup. (During setup, if you need more details of the procedures described, page numbers are provided where you can find complete, step-by-step instructions.)

After you've completed the setup, you're ready to use your VCR. Follow the instructions provided in "To Watch a Video," "To Watch TV After a Video" and "To Record a Program Using the Timer" for your specific hookup.

(Again, if you need step-by-step instructions, page numbers are provided where you can find this information.)

Before making the connections, check the following points:

- Turn off the power to the VCR and TV.
- Do not connect the AC power cord until all of the connections are completed.



- Make connections firmly. Loose connections may cause picture distortion.
- If your TV doesn't match any of the examples provided, consult your nearest Sony dealer or qualified technician.

Caution

Connections between the VCR VHF/UHF OUT connector and the antenna terminals of a TV receiver should be made only as shown in the instructions. Failure to do so may result in operation that violates the regulations of the Federal Communications Commission regarding the use and operation of RF devices. Never connect the output of the recorder to an antenna or make simultaneous (parallel) antenna and recorder connections at the antenna terminals of your receiver.

Hookup 1

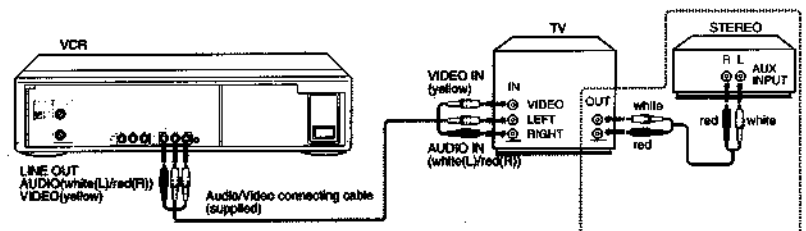
Audio/Video (A/V) Hookup

If your TV has audio/video (A/V) input jacks, you will get a better picture by hooking up your VCR through these jacks. In addition, for a true "home theater" environment, you can connect the audio outputs of your VCR or TV to your stereo system. (The connection for this environment is shown in the diagram below by surrounding with dotted lines.)

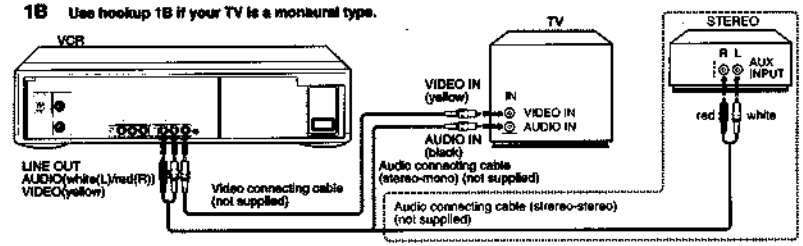
If your TV doesn't have A/V inputs, see the following pages for antenna or cable hookup.

If you only wish to play back pictures and movies, this is the only thing you have to do. If you also want to record off-air or off your cable TV system, do the A/V hookup on this page first, then go to the following pages for antenna or cable hookup.

1A Use hookup 1A if your TV is a stereo type.



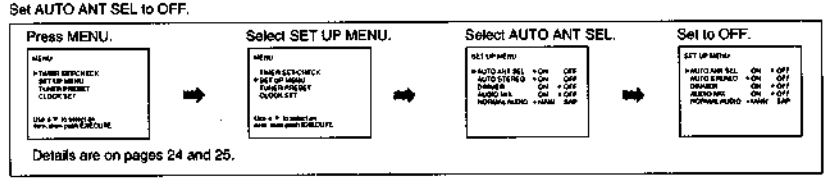
1B Use hookup 1B if your TV is a monaural type.



After you've hooked up your TV using the A/V jacks, use the following procedure to set up and use the VCR with your TV.

A/V Setup & Operation

Set AUTO ANT SEL to OFF.



SECTION 1
GENERAL

SL-HF2000

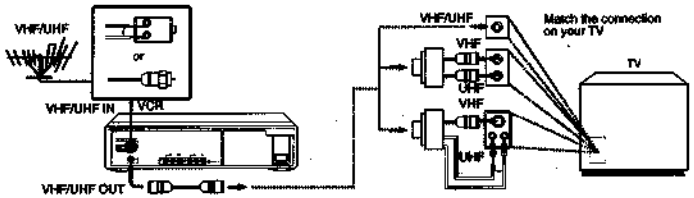
This section is extracted from instruction manual.

Hookup 2

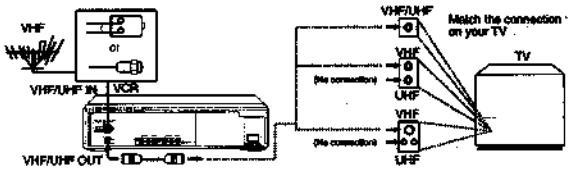
Antenna Hookup

Make the following connections if you're using an antenna (not cable TV). Check the type of antenna you are using and choose the appropriate connection.

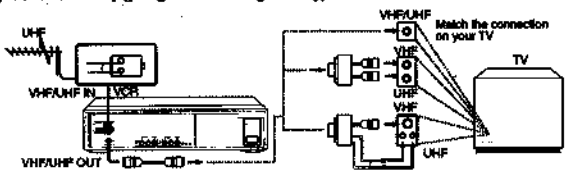
2A Use hookup 2A for VHF/UHF antenna (you get Ch 2 – 13 and Ch 14 or higher).



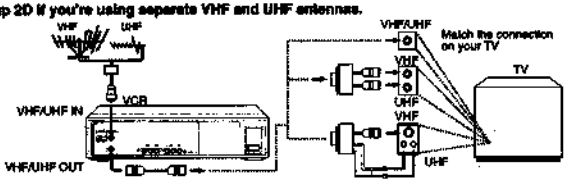
2B Use hookup 2B for VHF only (you get Ch 2 – 13 only).



2C Use hookup 2C for UHF only (you get Ch 14 or higher only).



2D Use hookup 2D if you're using separate VHF and UHF antennas.

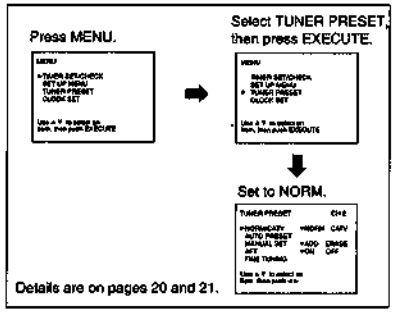


Details are on pages 54 and 55.

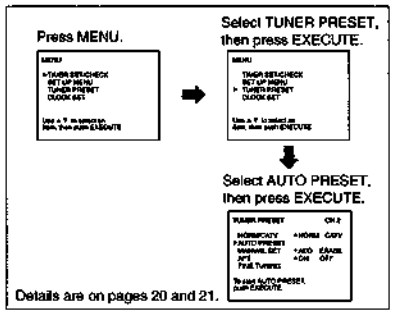
VCR Setup (Antenna)

1 Set the RF UNIT selector on the back of the VCR to CH 3 or CH 4.
If you have made A/V connections on page 7, skip this step.

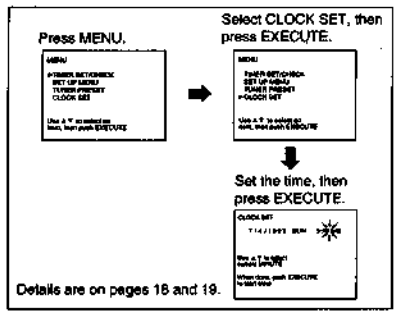
2 Set NORM/CATV to NORM on the on-screen display.



3 Preprogram the channels into the VCR.



Clock Setting



To Watch a Video

1 Tune the TV to CH 3 or CH 4, whichever you set with the RF UNIT selector on the back of the VCR. (If you have made the A/V connections on page 7, set your TV to the A/V input instead.)
2 Insert a cassette and press ▷ PLAY.

Details are on pages 26 and 27.

To Watch TV After a Video

1 Turn your VCR off, or press the VCR's TV/VTR button until "VTR" goes off in the display window.
2 Tune the TV normally.

(If you have made A/V connection and set AUTO ANT SEL. to OFF on page 7, simply release the A/V input on your TV so that you can tune TV normally.)

To Record a Program Using the Timer

1 Insert a cassette.
2 Press MENU.
3 Select TIMER SET/CHECK.
4 Press EXECUTE.
5 Set DATE, START time, STOP time, CHannel and tape speed (recording mode).
6 Press EXECUTE and then TIMER REC (ON/OFF).

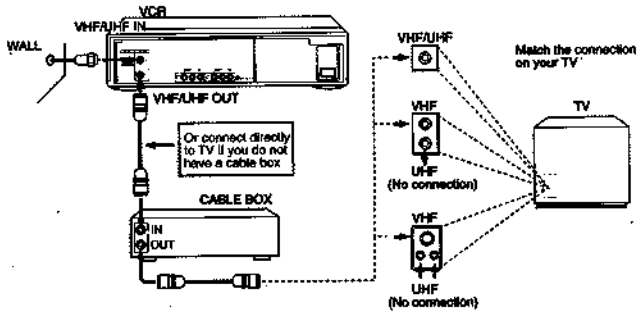
Details are on pages 34 and 35.

Hookup 3

Simple Cable Hookup

Recommended Use:
Since this is the simplest hookup, we recommend that you try this hookup first. If you cannot record the channels you want, you'll need to change your hookup to one of the choices on the following pages, or contact your cable company for assistance.

Background
This VCR can record virtually any unscrambled cable channel. Some cable systems "scramble" specific channels, usually premium or pay-per-view channels. You aren't able to record scrambled channels with this hookup.



What You Can and Can't Do With This Hookup

What You Can Do
- Record any unscrambled channels directly, without using the cable box.

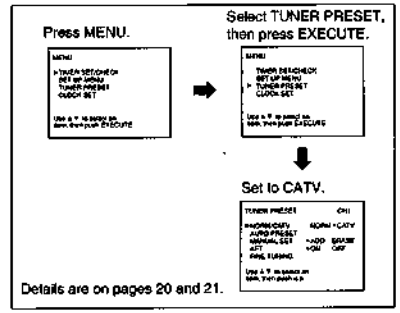
What You Can't Do
- Record scrambled channels that require a cable box.

VCR Setup (Simple Cable)

1 Set the RF UNIT selector on the back of the VCR to CH 3 or CH 4.
If you have made A/V connections on page 7, skip this step.

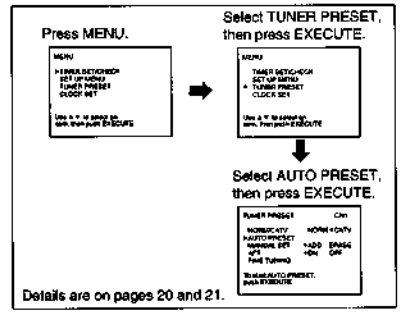
Set to whichever channel is not used in your area. If both are used, pick either channel.
Details are on page 53.

2 Set NORM/CATV to CATV on the on-screen display.



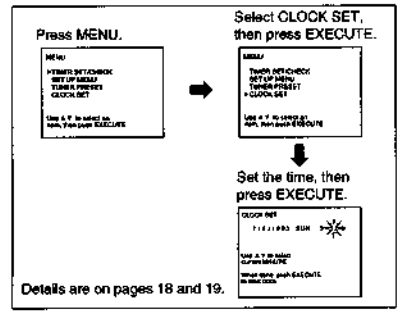
Details are on pages 20 and 21.

3 Preprogram the channels into the VCR.



Details are on pages 20 and 21.

Clock Setting



Details are on pages 18 and 19.

To Watch a Video

1a If you haven't made A/V connections:
- Turn your cable box on.
- Select CH 3 or CH 4 on your cable box (whichever you set on the back of the VCR).
- Select the cable box output channel (usually 2, 3 or 4) on your TV.

1b If you have made the A/V connections on page 7: Set your TV to the A/V input.

2 Insert a cassette and press ▷ PLAY.

Details are on pages 26 and 27.

To Watch TV After a Video

1 Turn your VCR off, or press the VCR's TV/VTR button until "VTR" goes off in the display window. (If you have made A/V connection and set AUTO ANT SEL to OFF on page 7, simply release the A/V input on your TV so that you can tune TV normally.)
2 Select the channel on your cable box and select the cable box output channel on your TV (if you have one), or directly tune on your TV (if you don't).

To Record a Program Using the Timer

1 Insert a cassette.
2 Press MENU.
3 Select TIMER SET/CHECK.
4 Press EXECUTE.
5 Set DATE, START time, STOP time, CHannel and tape speed (recording mode).
6 Press EXECUTE and then TIMER REC (ON/OFF).

Details are on pages 34 and 35.

Hookup 4

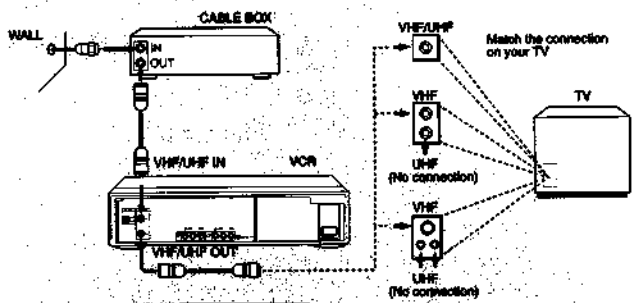
Alternate Cable Hookup

Recommended Use:

This hookup will allow you to record either scrambled or unscrambled channels. However, you will have to set the channel on the cable box for each program you want to record. If your cable system scrambles all or most channels, you must use this hookup. If your cable system scrambles only a few channels, you may prefer **Hookup 3** or **5** (on pages 10 and 14, respectively). Note that **Hookup 3** will not allow you to record scrambled channels, and that **Hookup 5** will allow you to record either scrambled or unscrambled channels, but will require that you purchase a few extra parts at your local electronics store.

Background

This VCR can record virtually any unscrambled cable channel. Some cable systems "scramble" specific channels, usually premium or pay-per-view channels. Although this hookup will also allow you to record these scrambled channels, you must use the cable box rather than the VCR to select channels.



What You Can and Can't Do With This Hookup

What You Can Do

- Record any channel by selecting the channel on the cable box.

What You Can't Do

- Record with the cable box turned off.
- Record by selecting channels directly from the VCR.
- Record one channel while watching another channel.

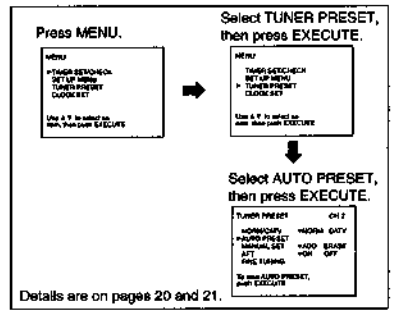
VCR Setup (Alternate Cable)

1 Set the RF UNIT selector on the back of the VCR to CH 3 or CH 4.
If you have made A/V connections on page 7, skip this step.

Set to whichever channel is not used in your area. If both are used, pick either channel.
Details are on page 53.

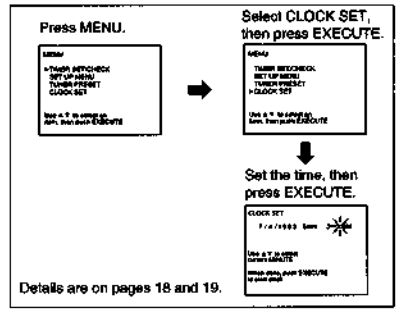
2 Turn your cable box on.

3 Preprogram the channels into the VCR.



Details are on pages 20 and 21.

Clock Setting



Details are on pages 18 and 19.

To Watch a Video

1 Tune the TV to CH 3 or CH 4 (or to A/V input if you have made A/V connections on page 7).
2 Insert a cassette and press ▷ PLAY.

Details are on pages 26 and 27.

To Watch TV After a Video

1 Turn your VCR off, or press the VCR's TV/VTR button until "VTR" goes off in the display window.
(If you have made A/V connection and set AUTO ANT SEL to OFF on page 7, simply release the A/V input on your TV so that you can tune TV normally.)
2 Turn your cable box on.
3 Select the cable box output channel (usually 2, 3, or 4) on your TV.
4 Select the channel, which you want to watch, on your cable box.

To Record a Program Using the Timer

1 Insert a cassette.
2 Turn your cable box on.
3 Select the channel, which you want to record, on your cable box.
4 Press MENU, and select TIMER SET/CHECK, and press EXECUTE.
5 Set DATE, START time, STOP time, CHannel and tape speed (recording mode).
The channel number must be the same as the cable box output channel (2, 3 or 4).
6 Press EXECUTE and then TIMER REC (ON/OFF).
7 Leave your cable box on.

Details are on pages 34 and 35.

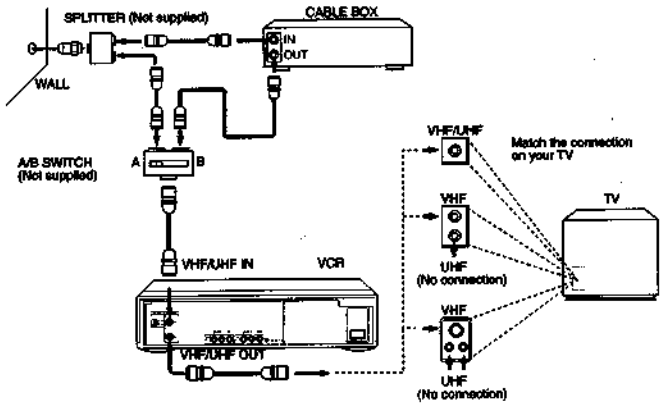
Hookup 5

Advanced Cable Hookup

Recommended Use:
By using the A/B switch, this hookup allows you to record unscrambled channels directly with the VCR (position 'A'). You only use position 'B' and the cable box if you want to record a "scrambled" channel. This gives you the most convenient operation of the VCR's timer.

Background
This VCR can record virtually any unscrambled cable channel. Some cable systems "scramble" specific channels, usually premium or pay-per-view channels. This hookup will allow you to record unscrambled channels by selecting 'A' with the A/B switch, and tuning the channel directly on your VCR. To record "scrambled" channels, select 'B' with the A/B switch, and select the channel using the cable box. If your cable system scrambles all or most channels, you must use the alternate cable hookup (**Hookup 4**) on page 12.

* Only one cable is supplied with your VCR.
Additional cables are necessary for this connection.



What You Can and Can't Do With This Hookup

What You Can Do
- Record unscrambled channels directly with the A/B switch in the 'A' position.
- Record scrambled channels with the A/B switch in the 'B' position.

What You Can't Do
- Record scrambled channels directly without the cable box.
- Watch a different channel while you are recording a scrambled channel.
- Record scrambled channels with the A/B switch in the 'A' position.

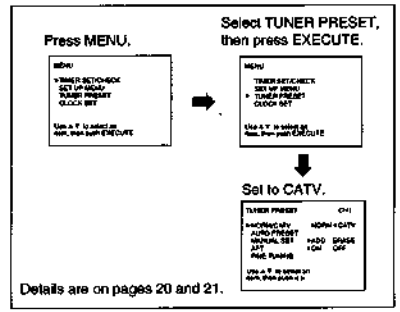
VCR Setup (Advanced Cable)

1 Set the RF UNIT selector on the back of the VCR to CH 3 or CH 4.
If you have made A/V connections on page 7, skip this step.

Set to whichever channel is not used in your area.
If both are used, pick either channel.
Details are on page 53.

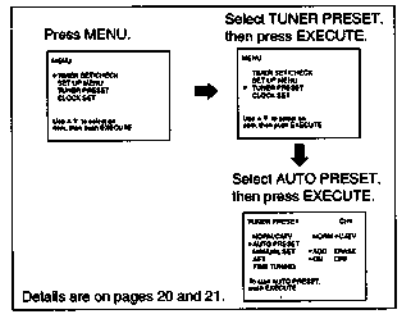
2 Set the A/B switch to 'A'.

3 Set NORM/CATV to CATV on the on-screen display.



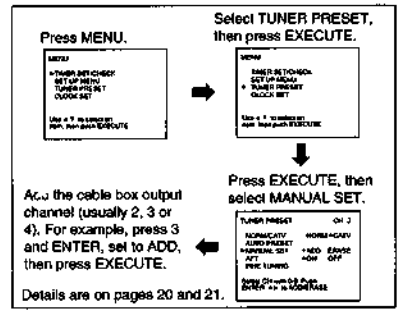
Details are on pages 20 and 21.

4 Preprogram the channels into the VCR.



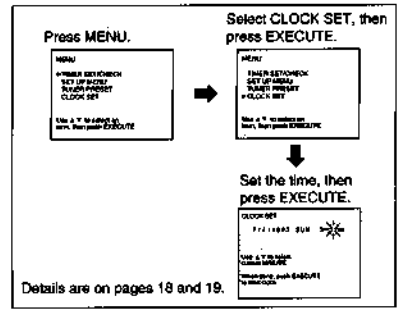
Details are on pages 20 and 21.

5 Add the cable box output channel (usually 2, 3, or 4).



Details are on pages 20 and 21.

Clock Setting



Details are on pages 18 and 19.

To Watch a Video

1 Tune the TV to CH 3 or CH 4 (or to A/V input if you have made A/V connections on page 7).
2 Insert a cassette and press ▷ PLAY.

Details are on pages 26 and 27.

To Watch TV After a Video

1 Turn your VCR off, or press the VCR's TV/VTR button until "VTR" goes off in the display window.
(If you have made A/V connection and set AUTO ANT SEL to OFF on page 7, simply release the A/V input on your TV so that you can tune TV normally.)
2 Set the A/B switch to 'B'.
3 Turn your cable box on.
4 Select the cable box output channel (usually 2, 3 or 4) on your TV.
5 Select the channel, which you want to watch, on your cable box.
6 After watching TV, return the A/B switch and cable box channel to the correct position.

To Record a Program Using the Timer

Unscrambled Channels

1 Insert a cassette.
2 Switch the A/B switch to 'A'.
3 Press MENU and select TIMER SET/CHECK.
4 Press EXECUTE.
5 Set DATE, START time, STOP time, CHannel and tape speed (recording mode).
6 Press EXECUTE and then press TIMER REC (ON/OFF).
7 Leave the A/B switch at 'A'.

Scrambled Channels

1 Insert a cassette.
2 Switch the A/B switch to 'B'.
3 Turn your cable box on.
4 Select the channel, which you want to record, on your cable box.
5 Press MENU and select TIMER SET/CHECK.
6 Press EXECUTE.
7 Set DATE, START time, STOP time, CHannel and tape speed (recording mode).
The channel number must be the same as the cable box output channel (2, 3 or 4).
8 Press EXECUTE and then TIMER REC (ON/OFF).
9 Leave the A/B switch at 'B'.

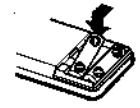
Details are on pages 34 and 35.

Preparing the Remote Commander

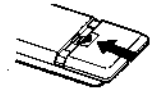
Inserting Batteries

1 Open the lid.

2 Insert two size AA (IEC designation R6) batteries with the polarity lined up correctly.



3 Close the lid.

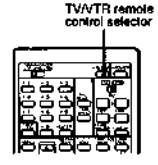


Notes on handling the batteries

- With normal use, the batteries should last for approximately six months.
- If you do not use the Remote Commander for an extended period of time, remove the batteries to avoid possible damage from battery leakage.
- Do not use a new battery with an old one, or use different types of batteries.

Setting the TV/VTR Remote Control Selector

You can control both the VCR and some Sony TVs with the Remote Commander. You must set the TV/VTR remote control selector to the 'TV' or 'VTR' position depending on whether you want to control the VCR or the TV.



When controlling the VCR

Set the TV/VTR remote control selector to the 'VTR' position.

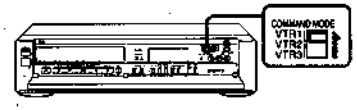
When controlling a Sony TV

Set the TV/VTR remote control selector to the 'TV' position. The buttons marked with a small yellow dot can be used to control Sony TV sets bearing the ■ mark.

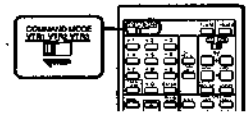
Setting the Command Mode

You can select three different settings for the Remote Command Mode to operate the VCR with the Remote Commander.

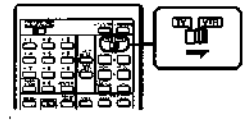
1 Set the COMMAND MODE selector on the VCR to VTR1.



2 Set the COMMAND MODE selector on the Remote Commander to VTR1.



3 Set the TV/VTR remote control selector on the Remote Commander to VTR.



Controlling Other Sony Video Equipment Having a COMMAND MODE Selector

1 Set the COMMAND MODE selector on the Remote Commander to a position other than the one you selected for this VCR.
2 Set the COMMAND MODE selector of any other video equipment to the same position you selected in step 1.

If the other Sony video equipment does not have a COMMAND MODE selector, you can control other Sony video equipment using the following COMMAND MODE settings:

Infrared remote controlled Sony Betamax VCRs: VTR1
(Some of them may not be controlled at this setting)
Sony 8 mm format VCRs: VTR2
Sony VHS format VCRs: VTR3

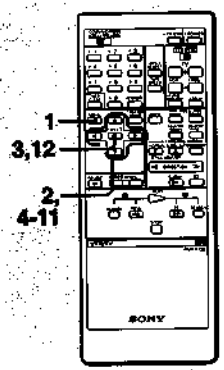
Setting the Time and Date

Before you can do timer recording, you first need to set the clock in the VCR.

Example of Time and Date Setting

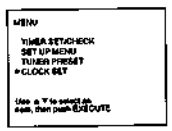
Example: To set to 3:32 pm, July 4, 1993

Use ▲ or ▼ to move the cursor.
Use ◀ or ▶ to select an item.



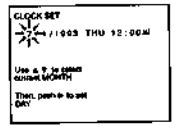
1 Press MENU.
The main MENU screen appears.

2 Press ▲ or ▼ to move the cursor (▶) to CLOCK SET.

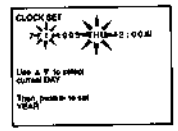


3 Press EXECUTE.
"1/1/1993 FRI 12:00 AM" is displayed. The leftmost 1, in the 'month' position, flashes.

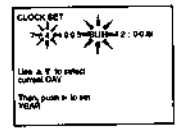
4 Press ▲ or ▼ until "7" appears in the 'month' position.



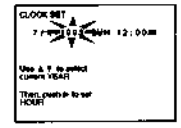
5 Press ▶ to make the number in the 'day' position flash.



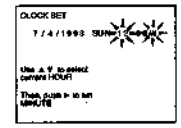
6 Press ▲ or ▼ until "4" appears in the 'day' position.
The day of the week is set automatically.



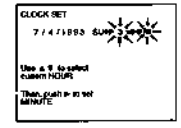
7 Press ▶ to make the year flash and press ▲ or ▼ if you need to change the year.
This time you want to leave the year unchanged, so just press ▶.



8 Press ▶ to make the hour flash.



9 Press ▲ or ▼ until "3" and "PM" appear.



10 Press ▶ to make the minutes flash.

11 Press ▲ or ▼ until "32" appears in the 'minute' position.

12 Press EXECUTE to start the clock.
Pressing EXECUTE will set the clock to 3:32 pm 00 seconds.

Notes:

- You cannot set the time and date during timer recording, timer-recording standby or quick-timer recording.
- Though the time and date are not displayed in the display window during playback and recording, the clock keeps running. The time and date are shown in the display window only when the unit is turned off or when the cassette is ejected.

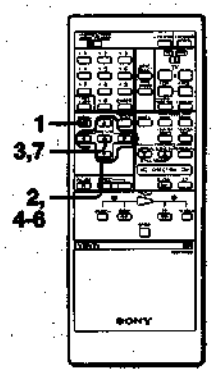
Presetting the Active Channels

This VCR is capable of receiving VHF channels 2 to 13, UHF channels 14 to 69 and CATV channels 1 to 125. These channels can be preset using the Remote Commander and the TUNER PRESET display. First, we recommend that you preset the active channels in your area using the automatic preset mode. Then, if there are any unwanted channels, disable them manually. If you have already decided which channels you want to preset on the VCR, set them manually using the channel number buttons.

Before presetting channels, check the following points:
- Turn the VCR and the TV on.
- If you have connected the TV and the VCR through the VHF/UHF OUT connector on the VCR only, make sure that the TV is set to the correct channel (CH 3 or CH 4) for the VCR.
- If you have connected the TV and the VCR through the LINE OUT jacks on the VCR, select the input for the VCR on the TV.
- Press TV/VTR so that "VTR" lights up in the display window on the VCR.
- Press INPUT SELECT so that a channel number appears in the display window on the VCR.

Presetting All Receivable Channels Automatically

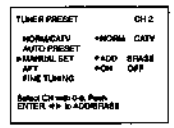
Use ▲ or ▼ to move the cursor.
Use ◀ or ▶ to select an item.



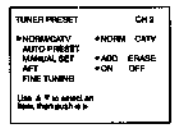
1 Press MENU.
The main MENU screen appears.

2 Press ▲ or ▼ to move the cursor (▶) to TUNER PRESET.

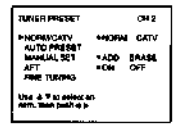
3 Press EXECUTE.
The TUNER PRESET screen is displayed.



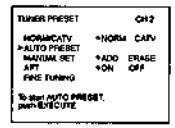
4 Press ▲ or ▼ to move the cursor to NORM/CATV.



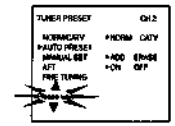
5 Press ◀ or ▶ to select NORM or CATV.
NORM presets the VHF and UHF channels; CATV presets your cable TV channels. The lowest channel number, 2 for NORM and 1 for CATV, will appear on the screen.



6 Press ▲ or ▼ to move the cursor to AUTO PRESET.



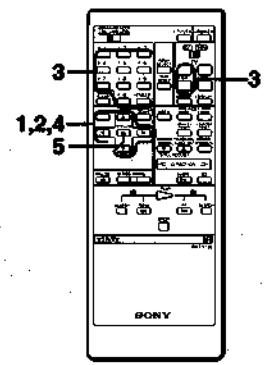
7 Press EXECUTE.
Receivable channels begin presetting in the numerical sequence. While presetting, "Please wait" appears and flashes on the screen. When no more channels can be found, the presetting stops and the picture of the lowest numbered channel is displayed on the TV screen.



Presetting Desired Channels or Disabling Unwanted Channels

After automatic presetting, you can disable and/or add channels manually.

Use ▲ or ▼ to move the cursor.
Use ◀ or ▶ to select an item.

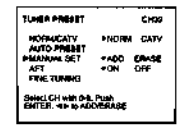


1 Follow steps 1 to 3 in "Presetting All Receivable Channels Automatically" on page 20.

2 Press ▲ or ▼ to move the cursor to MANUAL SET.

3 To disable channels, press CH +/– to select the channel.
To add channels, press channel number buttons (0 to 9) and then ENTER to select the channel.

4 To disable channels, press ▶ to select ERASE.
To add channels, press ◀ to select ADD.

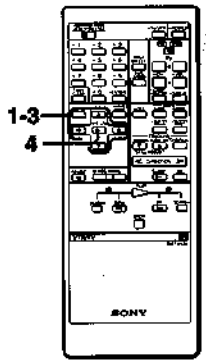


5 Press EXECUTE.
When you press CH +/–, the disabled channels are removed and the added channels are displayed.

Presetting the Active Channels

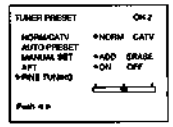
Fine-tuning

Normally, the Auto Fine Tuning (AFT) setting on the TUNER PRESET menu is set to ON, and the AFT function automatically fine-tunes the picture. If you change the channel and the picture is not acceptable, fine-tune it manually.

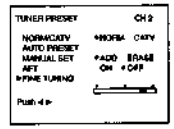


1 Display the TUNER PRESET screen referring to steps 1 to 3 in "Presetting All Receivable Channels Automatically" (page 20).

2 Press ▲ or ▼ to move the cursor (▶) to FINE TUNING.
The fine tuning indicator is displayed on the screen.



3 Press ◀ or ▶ to get a clearer picture.
The AFT automatically switches to OFF.
(If you cannot get a better picture, press ▲ or ▼ to move the cursor to AFT and reselect ON.)



4 Press EXECUTE.

The FINE TUNING indicator

The FINE TUNING indicator shows the operable fine-tuning range and stops at the optimal point of reception. When the VCR tuner is receiving an optimal broadcast signal, the indicator stops at the center position or one space right or left of the center position. However, even when a broadcast is received in an optimal condition, the indicator may not be at the optimal position.

Cable TV Channel Assignment

Cable TV systems use letters or numerals to designate channels. To tune in a CATV channel, refer to the chart below which shows the CATV channel numbers on this VCR and the corresponding CATV channel. Note that the channel number assignment shown in the chart may not correspond to the channel number used by your local cable company. Check with your local cable TV company for more information on the available channels.

Number on this VCR	1	2	...	13	14	15	16	17	18
Corresponding CATV channel	A-8	2	...	13	A	B	C	D	E

19	20	21	22	23	24	25	26	27	28	29	30	31
F	G	H	I	J	K	L	M	N	O	P	Q	R

32	33	34	35	36	37	...	94	95	96	97	98	99
S	T	U	V	W	W+1	...	W+58	A-5	A-4	A-3	A-2	A-1

100 ... 125
W+59... W+84

This VCR is designed to correspond to the standard cable system. However, the cable TV services may vary from area to area. Your local cable TV company may have adopted either the HRC or IRC cable system. This VCR is capable of properly receiving these two cable systems as well as the standard cable system.

1) HRC (Harmonic Related Carriers)

All channels except for 5 and 6 are 1250 kHz lower than the standard cable system. Channels 5 and 6 are 750 kHz higher than the standard cable system.

2) IRC (Incremental Related Carriers)

All channels except for 5 and 6 are the same as the standard cable system. Channels 5 and 6 are 2000 kHz higher than the standard cable system.

The FINE TUNING level bar for receiving HRC or IRC cable systems

Even when signals are received in optimal condition, the mark on the FINE TUNING level bar will not stay at the center position for channels higher or lower than the standard cable system due to the difference in the frequencies.

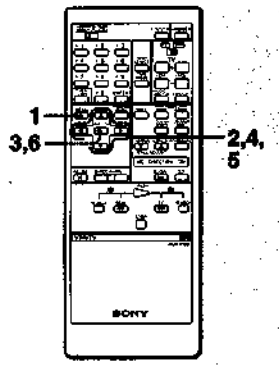
Note

Many cable TV systems use scrambled or encoded signals for some channels. You may require a cable box to receive some or all channels.

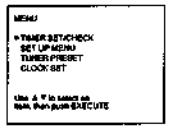
Using the SET UP MENU Screen

Before using your VCR, set your preferences on the SET UP MENU screen.

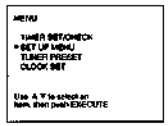
Use ▲ or ▼ to move the cursor.
Use ◀ or ▶ to select an item.



1 Press MENU.
The main MENU screen appears.

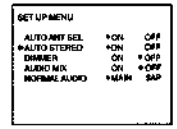


2 Press ▲ or ▼ to move the cursor (▶) to SET UP MENU.

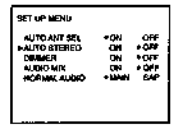


3 Press EXECUTE.
The SET UP MENU screen appears.

4 Press ▲ or ▼ to move the cursor to the desired menu choice. (For Menu Choices, see the next page.)



5 Press ◀ or ▶ to move the dot (●) to the desired setting.



6 Press EXECUTE to return to the original screen.
The settings are stored and will remain unless the power plug is disconnected.

Menu Choices

LANGUAGE (Canadian model only)
You can preset you VCR to display the screen information in either English or French.

AUTO ANT SEL (Automatic Antenna Selector)
- If your TV is connected only to the VHF/UHF OUT connector on the VCR, set to ON.

  When playing back a cassette, the picture is automatically displayed on the screen simply by selecting the channel for the VCR (CH 3 or CH 4) on the TV. To watch TV after the playback is over or you stop the playback (with this VCR still turned on), select a desired channel on the VCR, or press TV/VTR so that "VTR" goes off in the display window so that you can select a desired channel on your TV.

- If your TV is connected to both the VHF/UHF OUT connector and LINE OUT jacks on the VCR, set to OFF.

  When playing back a cassette, select the input for the VCR on the TV.
  To watch TV after the playback is over or you stop the playback (with this VCR still turned on), select a desired channel on the VCR.

AUTO STEREO
If a stereo program's reception is poor, set to OFF. The program is recorded in monaural but sound quality may improve. For details, see page 33.

DIMMER
To decrease the brightness of indications on the display window, set to ON. To resume the original brightness, set to OFF.

AUDIO MIX
To listen to sound recorded on both the HI-FI video track and the normal audio track of the tape, set to ON. For details, see page 31.

NORMAL AUDIO
When there is a SAP (Second Audio Program) broadcast, select SAP to record the SAP sound on the normal audio track. For details, see page 33.

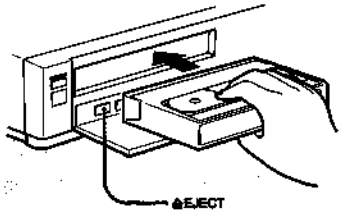
Playback

This section shows you how to insert, play back, and eject a video cassette.

Inserting a Video Cassette

1 Insert a video cassette as shown below.

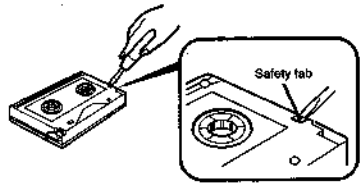
2 Gently press the center of the front side of the cassette until the mechanism draws it into the compartment.
When the cassette has been loaded, the cassette indicator (▭) lights up in the display window and the VCR turns on automatically.



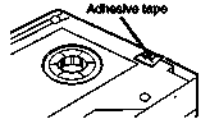
Note
If you insert a cassette without a safety tab while the VCR is turned off, the VCR turns on and playback starts automatically (auto power/playback function).

Ejecting the cassette
Press ⏏ EJECT on the VCR. You can eject the cassette when the power is off.
When you press ⏏ EJECT, the power is turned on. After ejecting the cassette, the power automatically shuts off.

Protecting your cassettes against accidental erasure
Cassettes have a safety tab to protect against accidental recording. Break off the safety tab with a screwdriver or other tools. If the safety tab is removed, the cassette will be ejected when you try to record on it.



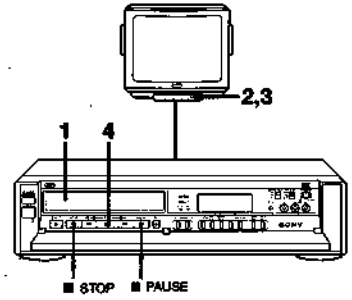
To record on a cassette with the safety tab broken off, simply cover the opening with adhesive tape.

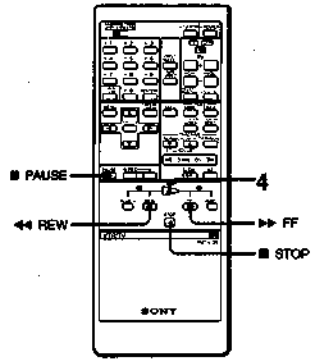


Maximum recording time of a cassette
Recording in either ▭ or ▭ mode is possible with this VCR. When recording, select ▭ or ▭ using TAPE SPEED. During playback, the VCR automatically detects the recording format, and then plays back the cassette in the appropriate mode. A cassette recorded in ▭ mode runs 1.5 times as slowly as a cassette recorded in ▭ mode. Refer to the chart below for the recording/playback times available.

Cassette tape	Recording/Playback time	
	▭	▭
L-125	30 min.	45 min.
L-250	1 hr.	1 hr. 30 min.
L-500	2 hr.	3 hr.
L-750	3 hr.	4 hr. 30 min.
L-830	3 hr. 20 min.	5 hr.

Cassettes recorded in ▭ mode
Playback of cassettes recorded in ▭ mode is also possible with this VCR. However, playback in any other mode than normal forward speed is not guaranteed. This VCR is not designed to record in ▭ mode.





Note on playback
When playing back the beginning of a recording, the picture may be distorted or some streaks may appear in the picture.

Play Back a Tape

1 Insert a cassette.

2 Turn the TV on.

3 If your TV is connected to both the VHF/UHF OUT connector and LINE OUT jacks on the VCR, select the input for the VCR. If your TV is connected only to the VHF/UHF OUT connector on the VCR, select the channel for the VCR (CH 3 or CH 4).

4 Press ▷ PLAY.

To stop playback
Press ■ STOP.

To stop playback for a moment, press ❚❚ PAUSE.
To resume playback, press ❚❚ PAUSE again or ▷ PLAY.
When the pause mode lasts for approximately 8 minutes, the VCR enters automatically stop mode.

To fast-forward the cassette during stop mode
Press ▶▶ FF.

To rewind the cassette during stop mode
Press ◀◀ REW.

To rewind the cassette to its beginning and to playback automatically (auto playback function)
Press ▷ PLAY while pressing ◀◀ REW on the VCR.
You cannot use the Remote Commander for the auto playback function.

When the tape reaches the end
The tape automatically rewinds to the beginning (auto rewind function), and power remains on.

Play Back a Tape Recorded with *Super* Beta Function

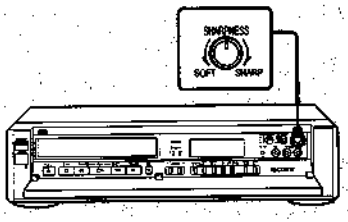
When you play back a tape recorded with ***Super* Beta** function on, press SUPER BETA on the VCR so that the ***Super* Beta** lamp on the VCR lights up.

Played-back tape	*Super* Beta	
	Function	Lamp
Tape recorded with ▭s or ▭s*SHB*	on	on
Tape recorded with ***Super* Beta**	on	on
Tape recorded without ***Super* Beta**	off	off

Note on *Super* Beta function
If you do not select ***Super* Beta** function to match the recording condition of a played-back tape, noise may appear in the picture.

Adjusting the Sharpness of the Played-Back Picture

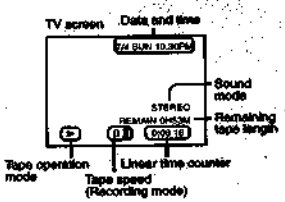
You can adjust the sharpness of the played-back picture according to your preference.



To get a sharper picture, turn the SHARPNESS control toward SHARP.
To get a softer picture, turn the SHARPNESS control toward SOFT.

The On-Screen Display

To delete or call up VCR information on the TV screen, press DISPLAY on the Remote Commander.



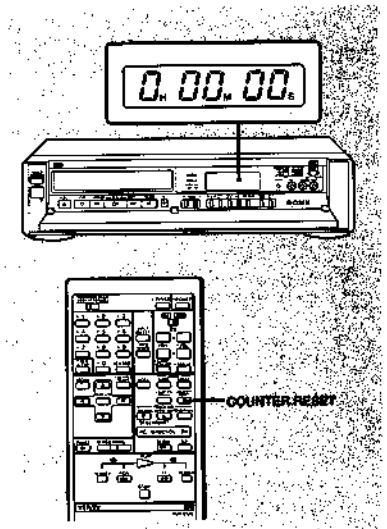
Note
The on-screen display cannot be displayed on the TV screen during freeze mode, slow motion playback or high-speed playback.

Indexing Tape Contents

When a cassette is inserted, the clock display will be automatically switched to the counter display and the counter reading "0:00:00s" will appear in the display window. (If the counter display is in the remaining time indication mode, "–:––:––" will appear instead. Press COUNTER/REMAIN to resume the time counter.) When you start playback, the counter start working. By noting the counter readings, you can find these points later by referring to the counter. Use the label on the cassette to list the programs and their counter readings.

To reset the counter to "0:00:00s" during playback or pause

Press COUNTER RESET on the Remote Commander.

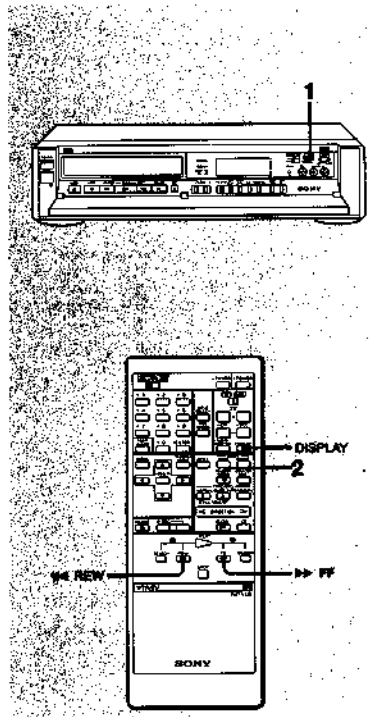


Notes on counter reading

- After a cassette is ejected, the counter display will be automatically switched to the clock display. When a cassette is reinserted, the counter display will appear and show the counter reading "0:00:00s" except when the counter display is in the remaining time indication mode.
- The counter does not work properly on the portions on which no recording has been made.

Checking the Remaining Time of a Tape

You can check the remaining time of a tape during playback or recording.



1 Before starting playback or recording, set the TAPE SELECT selector to the correct position according to the tape you use, by referring to the table below.

Position to be set to	Tape to be used
L500	L-500 and shorter
L750	L-660 and L-750
L830	L-830

2 Press COUNTER/REMAIN during playback or recording.
The time counter in the display window now changes to show the remaining time. (The remaining time is always shown on the on-screen display on the TV screen if you press DISPLAY.)

To resume the time counter in the display window

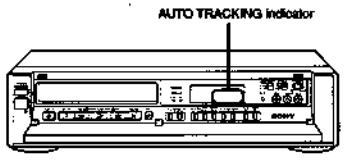
Press COUNTER/REMAIN again.

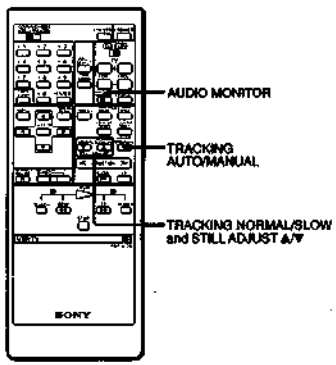
Notes on the remaining time

- It takes time to calculate the remaining time after starting to play back a tape. (When the remaining time cannot be calculated, "–:––:––" is displayed instead.)
- The remaining time is not to be displayed, if you press ▶▶ or ◀◀ before the remaining time is displayed. Instead, "–:––:––" is displayed.
- The remaining time cannot be changed even if you change the tape speed (⏸/■) during stop mode.
- The remaining time cannot be changed in the following cases:
  – during pause mode;
  – during stop mode;
  – during frame-by-frame picture (see page 41).
  – during slow motion playback (see page 42).
  When you press ▷ PLAY or X2, the normal remaining time resumes in several seconds.
- The remaining time may not be correct in the following cases:
  – when playing back a commercially available prerecorded tape;
  – when using a damaged or a non-standard tape;
  – when a tape has a blank portion or portion where the tape speed is changed;
  – when using a tape which has been rewound loosely.

Playing Back Externally-Recorded Tapes

When playing back a tape recorded on another VCR, the tracking condition is automatically adjusted. You can also adjust the tracking condition manually according to the following instructions.





Manual tracking adjustment

When the playback picture has streaks or snow during normal playback, adjust the tracking manually.

1 Press TRACKING AUTO/MANUAL.
The tracking level bar appears on the TV screen and "AUTO TRACKING" goes off in the display window.

2 Press TRACKING NORMAL/SLOW and STILL ADJUST ▼/▲ for the best possible picture.

To activate the automatic tracking function, press TRACKING AUTO/MANUAL again so that "AUTO TRACKING" lights up in the display window.

Automatic tracking adjustment

The tracking condition is automatically adjusted on this VCR. "AUTO TRACKING" flashes while the VCR is searching for the optimal tracking condition and lights when optimum playback picture is obtained. The automatic tracking function comes on in the following cases:

- when a cassette is inserted;
- when the tape speed on the played-back tape is switched;
- when the picture is distorted by scratches on the tape;
- when "AUTO TRACKING" is turned on by pressing TRACKING AUTO/MANUAL after the picture is adjusted manually.

Notes

- Auto tracking adjustment will not function well for tapes recorded in ⊞Is and ⊞Is*SHB* mode.
- During auto tracking adjustment, streaks or noise may occur.

Selecting the Monitor Sound

By pressing AUDIO MONITOR, you can select the appropriate sound mode to play back tapes with stereo or bilingual programs.
Each time you press the button, the display on the screen cycles among the four sound mode listed below. Leave the one showing that gives the sound track you want for the tape or broadcast you are listening to.

Sound Mode

Display on the screen	Sound to be heard	
	Stereo tape	Bilingual tape
L/R	Stereo	Left and right channels
L	Left channel	Left channel
R	Right channel	Right channel
None	Monaural on normal audio track	Sound on normal audio tack (SAP)

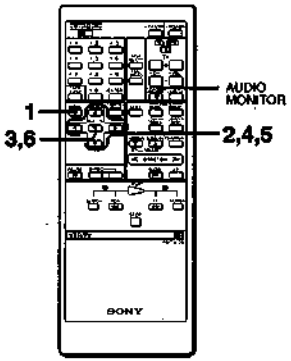
Notes

- When you play back a tape recorded in monaural, the sound is heard in monaural regardless of the sound mode setting above.
- When you play back a tape with non-Hi-Fi recording, the sound mode cannot be changed.

Listening to Mixed Hi-Fi and Normal Track Sound

You can hear sound recorded on the Hi-Fi video track and the normal audio track simultaneously. This allows you to listen to an audio-inserted cassette.

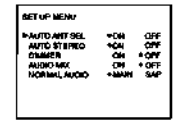
Use ▲ or ▼ to move the cursor.
Use ◀ and ▶ to select an item.



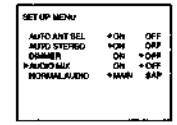
1 Press MENU.
The main MENU screen appears.

2 Press ▲ or ▼ to move the cursor (▶) to SET UP MENU.

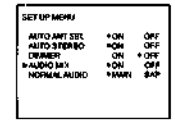
3 Press EXECUTE.
The SET UP MENU screen appears.



4 Press ▲ or ▼ to move the cursor to AUDIO MIX.



5 Press ◀ to move the dot (●) to ON.



6 Press EXECUTE to return to the original screen.

Notes

- When you set AUDIO MIX to ON, the AUDIO MONITOR button does not function.
- Reset AUDIO MIX to OFF after listening to the sound in audio mix mode.

Recording TV Programs

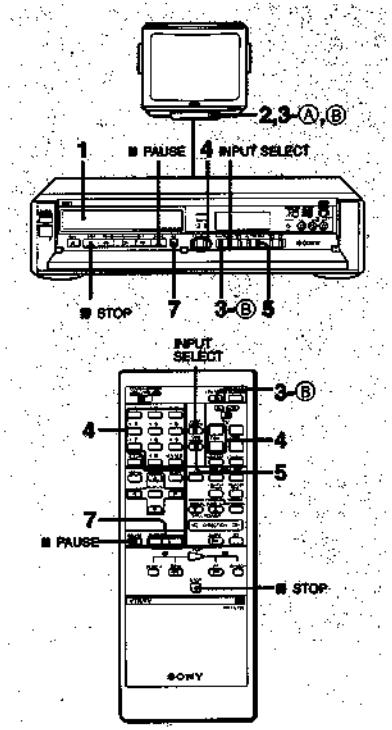
Before you begin, check the following points:

- Make sure that all the connections have been made correctly (see pages 6 to 16).
- Check the input mode indicator and the channel number indicator in the display window of the VCR (see page 58).
- Press INPUT SELECT repeatedly so that "LINE" disappears and the channel number appears in the display window.

Caution

Television programs, films, video cassettes and other materials may be copyrighted. Unauthorized recording of such materials may be contrary to the provisions of the copyright laws. Also, use of this recorder with cable television transmission may require authorization for the cable television and/or program owner.

Recording TV Programs



1 Insert a cassette.
The VCR turns on automatically (auto power on).

2 Turn the TV on.

3 Ⓐ If your TV is connected to both the VHF/UHF OUT connector and the LINE OUT jacks on the VCR, select the input for the VCR on the TV.

Ⓑ If your TV is connected only to the VHF/UHF OUT connector, set the TV to the preset channel (CH 3 or CH 4) for the VCR, then press TV/VTR so that "VTR" lights up in the display window.

4 Select the channel to be recorded with CH+/– (or CHANNEL +/– on the VCR).
You can also use channel number buttons on the Remote Commander to select the channel; however, you need to press ENTER after selecting the channel with the channel number buttons.

EXAMPLE: to select CH 125 with the channel number buttons, press 1, 2, 5 and then ENTER.

5 Select SP or LP with TAPE SPEED (SP/LP).
To select the best recording tape speed, see "Maximum recording time of a cassette" on page 26.

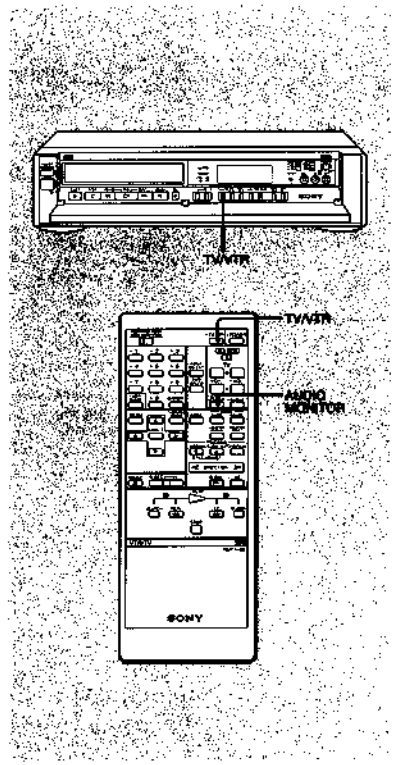
6 If you want the *Super* Beta function work to get a better picture quality in the recording, press SUPER BETA on the VCR so that the *Super* Beta lamp lights.

7 Press the two ● REC buttons on the Remote Commander at the same time, or the ● REC button on the VCR.

To stop recording
Press ■ STOP.

To stop recording for a moment
Press ❚❚ PAUSE.
To resume recording, press ■ PAUSE again.
When the recording pause mode lasts for approximately 8 minutes, the VCR enters automatically stop mode.

When the tape reaches its end
The tape rewinds to the beginning and the power remains on.



Recording with the TV Off

Turn off the power to the TV or color monitor.
There will be no interference with the recording.

Watching One TV Program While Recording Another

1 Press TV/VTR so that "VTR" goes off in the display window.
Skip this step if you have connected the TV and the VCR through the LINE OUT jacks.

2 Select the channel you want to watch on the TV.

When "VTR" is	Picture on the TV screen is from
Lit	Channel selected by the VCR tuner
Unlit	Channel selected by the TV tuner

Recording Multi Channel TV Sound (MTS) Broadcasts

To record a stereo broadcast

When a stereo broadcast program is received, the STEREO lamp lights up on the front panel of the VCR. The stereo program is automatically recorded in stereo. If a stereo program's reception is poor, set AUTO STEREO to OFF on the SET UP MENU screen (see pages 24 and 25). The sound is heard in monaural but the noise is reduced.

To record a Second Audio Program (SAP) broadcast

To record the SAP sound on the normal audio track, set NORMAL AUDIO to SAP on the SET UP MENU screen (see pages 24 and 25).
Normally, set NORMAL AUDIO to MAIN on the SET UP MENU screen so that the main sound is recorded on the normal track.

To monitor the SAP sound during recording, press AUDIO MONITOR to light the SAP lamp on the front panel of the VCR. (See page 30.)

Notes

- When recording other than a SAP broadcast, select MAIN for NORMAL AUDIO on the SET UP MENU screen. If you select SAP, no sound is recorded on the normal audio track.
- When the TV is connected only to the VHF/UHF OUT connector on the VCR, you cannot hear the program in stereo.

Timer Recording

The timer recording function lets you preset your VCR to record up to eight programs within a one-month period. You'll do this procedure on the TIMER SET/CHECK screen on your TV.

As a First Step

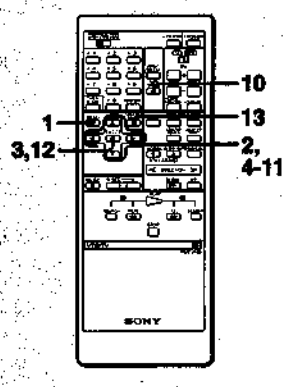
Before setting the timer, make sure that:

- The time and date are set correctly.
  If you try to put the VCR into timer-activated recording mode without having preset the time and date, the VCR will enter clock setting mode automatically.
  (See "Setting the Time and Date" on pages 18 and 19).
- The tape is long enough to record all the programs.
- The safety tab on the cassette is intact. If you insert a cassette with no safety tab and press TIMER REC (ON/OFF), the cassette automatically ejects from the VCR.
- The VCR and TV are both turned on.

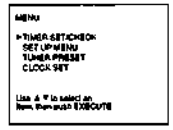
Setting the Timer

EXAMPLE: Here's how to record a program broadcast on channel 26 from 9:00 pm to 10:55 pm on Saturday, July 10, 1993 in SP mode.

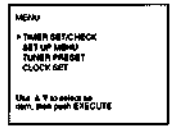
Use ▲ or ▼ to move the cursor.
Use ◀ and ▶ to select an item.



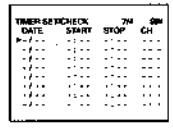
1 Press MENU.
The main MENU screen appears.



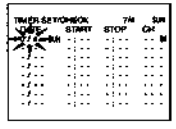
2 Press ▲ or ▼ to move the cursor (▶) to TIMER SET/CHECK.



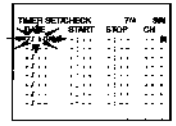
3 Press EXECUTE.
The TIMER SET/CHECK screen appears.
To reset the clock, refer to "Setting the Time and Date" (pages 18 and 19).



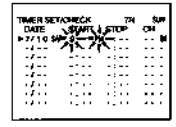
4 Press ▶.
Make sure that today's date is flashing.
If it isn't, reset the clock to the correct time. See "Setting the Time and Date" (pages 18 and 19).



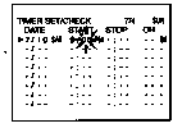
5 Press ▲ or ▼ to set the month and day to 7/10 SAT.
The day of the week is automatically set.



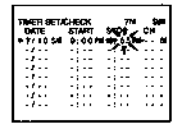
6 Press ▶ so that the hour position under "START" flashes. Then press ▲ or ▼ until "9" and "PM" appear.



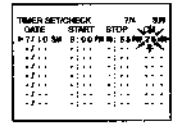
7 Press ▶ so that the minute position under "START" flashes. Then press ▲ or ▼ until "00" appears.



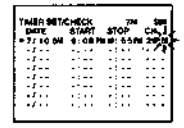
8 Press ▶.
The hour position under "STOP" flashes. Set both the hour and the minute under "STOP" to finish recording, referring to steps 6 and 7.



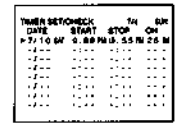
9 Press ▶ so that the "CH" position flashes. Then press ▲ or ▼ until "26" appears.
Only the channels preset in the VCR appear. You can also use the CH +/– or channel number buttons.



10 Press ▶ so that the tape speed position flashes. Then press ▲, ▼ or TAPE SPEED until your desired tape speed (SP/LP) appears.
To change or correct a setting before entering it, press ◀ to return to the item you wish to change.



11 Press ▶ to store the setting.
When all of the settings stop flashing and the cursor (▶) appears in the leftmost column, you've completed the setting. To preset another setting, press ▲ or ▼ to move the cursor (▶) to another line and repeat steps 4 to 11.



12 Press EXECUTE.
The message "Please push TIMER REC to set timer" appears.

13 Press TIMER REC (ON/OFF).
The VCR enters timer-recording standby mode and "TIMER" lights up in the display window.
If a cassette is not loaded into the VCR, "TIMER" will not light up in the display window, but the timer setting will be stored in the VCR.

To stop timer recording

To stop timer recording while a program is being recorded, press TIMER REC (ON/OFF).

Notes

- To change or correct the setting before completing it, press ◀ to return to the item you wish to change.
- To record video sources from LINE IN 1 or 2 jacks, press INPUT SELECT in step 9 to display "LINE 1" or "LINE 2" in the "CH" position. If you press the button three times, the previous channel number appears again in the "CH" position.
- If you don't do anything for more than one minute, the VCR automatically exits from the TIMER SET/CHECK screen.

Daily/weekly recording

You can preset your VCR for daily or weekly recording. Daily recording records the same program every day of the week while weekly recording records the same program every week. Follow steps 1 to 4 in "Setting the Timer" (page 34).

Then in step 5, press ▼.
Each time you press the button, the "DATE" section changes as follows:

Current date
↓
SUN — SAT (Every day of the week)
↓
MON — SAT (Every day except Sunday)
↓
MON — FRI (Every day except Saturday and Sunday)
↓
EVERY SAT
⋮
EVERY TUE
↓
EVERY MON
↓
EVERY SUN
↓
Date one month after from the current date

Follow step 6 and so on.

Timer-recording standby mode

When you put the VCR into timer-recording standby mode, you can record any previously preset programs. The VCR turns on automatically to record the first preset program. When it finishes recording, the power automatically shuts off.
To stop timer recording, press TIMER REC (ON/OFF).

Buttons operable during timer recording

TIMER REC (ON/OFF)	To stop timer recording.
COUNTER RESET	(See "Indexing Tape Contents" on page 28.)
COUNTER/REMAIN	(See "Checking the Remaining Time of a Tape" on page 29.)
TV/VTR	(See "Watching One TV Program While Recording Another" on page 33.)
DISPLAY	(See "The On-Screen Display" on page 28.)
MENU	Only to check settings. (See "Checking the Timer Settings" on page 38.)
INDEX MARK	(See "Marking Index Signals" on page 43.)
SUPER BETA	(See "Recording TV Programs" on page 32.)

Note

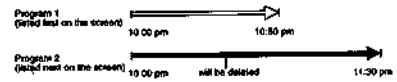
If a power interruption occurs during timer recording, recording will stop and your VCR will turn off. If power is restored within one hour and it's before the recording end time, recording will start again from that point. If the interruption lasts for more than one hour, any presettings will be erased and you'll need to reset the time and date for your programs. Note that the tape counter will return to "0:00:00."

Overlapping Timer Recordings

Case 1

If you preset two programs to record at the same time....

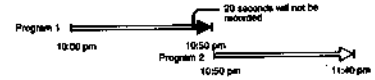
The program listed first on the TIMER SET/CHECK screen has priority over the other programs. The timer settings for lower priority programs will be deleted from the TIMER SET/CHECK screen when recording begins for the first program.



Case 2

If you preset program 2 to record at the same time you set program 1 to finish recording....

The last 20 seconds of program 1 will not be recorded.



Case 3

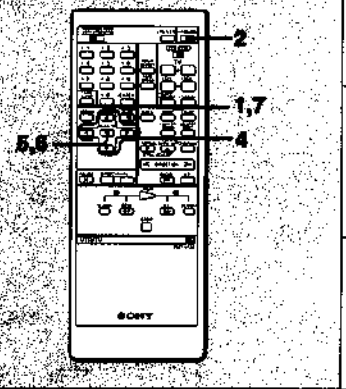
If you preset program 2 to record before program 1 has finished recording....

Program 2 will begin recording before program 1 is finished, so you will lose the last part of program 1.

Checking the Timer Settings

Here's how to display your timer settings to check the programs you want to record.

Use ▲ or ▼ to move the cursor.
Use ◀ or ▶ to select items.



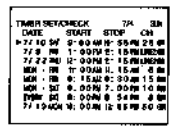
1 Press TIMER REC (ON/OFF).
"TIMER" goes off in the display window.

2 Press POWER.

3 Press MENU.
The main MENU screen appears.

4 Press ▲ or ▼ to move the cursor (►) to TIMER SET/CHECK.

5 Press EXECUTE.
The TIMER SET/CHECK screen appears.



6 Press EXECUTE to return to the original screen.

7 Press TIMER REC (ON/OFF).
The VCR returns to timer-recording standby mode.

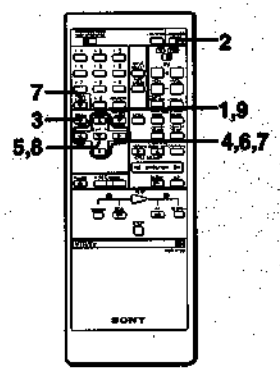
Notes

- If you set a program to record only once, that setting is erased from the TIMER SET/CHECK screen when the recording has finished.
- To check the timer settings during timer recording, follow steps 3 to 6 above.

Changing or Cancelling the Timer Settings

Here's how to change or cancel any timer settings from the TIMER SET/CHECK screen.

Use ▲ or ▼ to move the cursor.
Use ◀ or ▶ to select items.



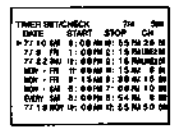
1 Press TIMER REC (ON/OFF).
"TIMER" goes off in the display window.

2 Press POWER.

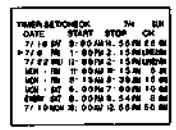
3 Press MENU.
The main MENU screen appears.

4 Press ▲ or ▼ to move the cursor (►) to TIMER SET/CHECK.

5 Press EXECUTE.
The TIMER SET/CHECK screen appears.



6 Press ▲ or ▼ to move the cursor (►) to a setting you wish to change or cancel.



7 To change the setting, select the item to be changed by pressing ◀ or ▶, then make changes by pressing ▲ or ▼.
To cancel it, press TIMER CLEAR.
Repeat this step to change or cancel other settings.

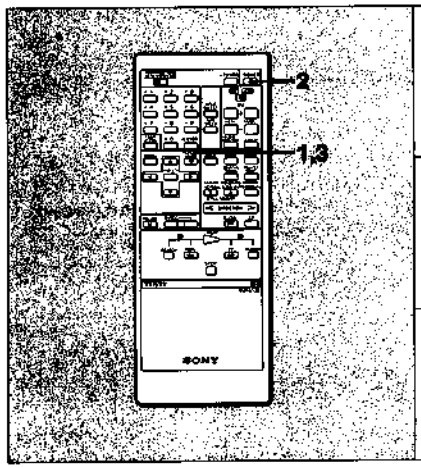
8 Press EXECUTE.
This stores the changes and the original screen resumes.

9 Press TIMER REC (ON/OFF).
The VCR returns to timer-recording standby mode.

Timer Recording

Using the VCR Before Timer Recording Starts

If you want to use your VCR while it's in timer-recording standby mode, you must first turn off "TIMER" from the display window. Here's how:



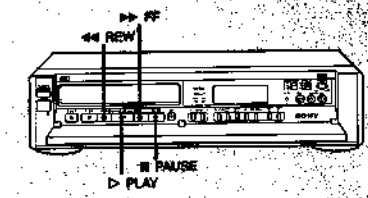
1 Press TIMER REC (ON/OFF).
"TIMER" goes off in the display window and the VCR leaves the timer-recording standby mode.

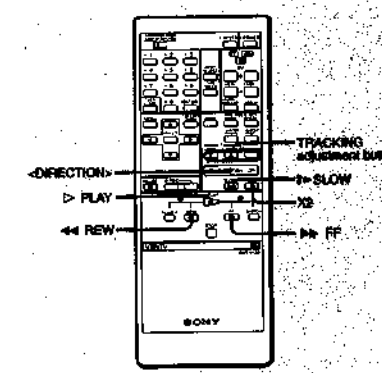
2 Press POWER.
The VCR is ready to use.

3 After using the VCR, press TIMER REC (ON/OFF).
The VCR returns to timer-recording standby mode again and "TIMER" lights up in the display window.

Variable Speed Playback

The following section explains the advanced playback functions you can use with your VCR. No sound can be heard during these operations.





Freeze Picture

When playing back a tape, press II PAUSE to hold the picture of a particular scene.
To resume normal playback, press either ▷ PLAY or II PAUSE. If you leave your VCR in pause mode, normal playback resumes after approximately 5 minutes.

Notes
Some snow or streaks are unavoidable during freeze picture.

Picture Search

You can fast-forward or rewind a tape while viewing the picture.

• Picture Search During Playback or Pause Mode
While playing or pausing, press ◀◀ REW or ▶▶ FF.
A high-speed picture without sound is displayed on the screen until you release the button.

If you release the button in pause mode, the VCR returns to pause mode again. If you release the button during playback, normal playback resumes.

• Picture Search While Fast-Forwarding or Rewinding a Tape
When fast-forwarding or rewinding a tape, you can press and hold ▶▶ FF or ◀◀ REW to view a high-speed picture.
For forward viewing: press ▶▶ FF during fast-forwarding.
For reverse viewing: press ◀◀ REW during rewinding.

When you release the button, the VCR continues fast-forwarding or rewinding.

Locked Picture Search

You can view a high-speed picture while playing or pausing, without holding ◀◀ REW or ▶▶ FF depressed.
In playback or playback pause mode, press ⊖ SEARCH (reverse) or ⊖ SEARCH (forward) on the Remote Commander.
To resume normal playback, press ▷ PLAY.

Frame-by-Frame Picture

During playback pause, Press < DIRECTION >.
Each time the button is pressed, the picture moves one frame.
To reverse the picture one frame, press < DIRECTION.
To advance the picture one frame, press DIRECTION >.
To resume normal playback, press ▷ PLAY.

Variable Speed Playback

Slow Motion Playback

In playback or playback pause mode, press ▶▶ SLOW on the Remote Commander. Change the playback direction with < DIRECTION >.

To play back in slow motion in the reverse direction
Press < DIRECTION.

To play back in slow motion in the forward direction
Press DIRECTION >.

To resume normal playback
Press ▷ PLAY.

Double Speed (X2) Playback

In playback or playback pause mode, press X2 on the Remote Commander. Change the playback direction with < DIRECTION >.

To play back at double speed in the reverse direction
Press < DIRECTION.

To play back at double speed in the forward direction
Press DIRECTION >.

To resume normal playback
Press ▷ PLAY.

Picture Adjustment During Variable Speed Playback

- If a picture played in slow motion displays streaks, adjust the picture with TRACKING NORMAL/SLOW and STILL ADJUST ▼/▲ on the Remote Commander.
- If the picture appears to shake in freeze mode, adjust it using TRACKING NORMAL/SLOW and STILL ADJUST ▼/▲ on the Remote Commander until the picture stabilizes. Moreover, in freeze mode you may notice a band at the top or bottom of the screen. Adjust the picture by playing back the tape in slow motion and using the TRACKING NORMAL/SLOW and STILL ADJUST ▼/▲ on the Remote Commander.

Notes

- Some snow or streaks are unavoidable during variable playback even though you adjust them with TRACKING NORMAL/SLOW and STILL ADJUST ▼/▲.
- When the tape transporting direction is changed during variable speed playback, the played back picture will be distorted for a moment.
- Tapes recorded in ⅡIs or ⅢE mode will have some snow or streaks during freeze picture or picture search.

Note on picture search performed on a tape recorded in ⅡIE mode

If you perform picture search on a tape recorded in ⅢE mode, the picture will be distorted as shown below. In addition, depending on the TV you use, the picture will be much more distorted, shake and/or become monochrome.
(If the picture rolls up and down or shakes too much, adjust the vertical hold on the TV.)

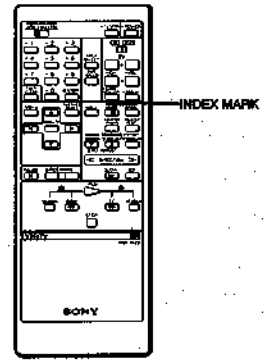
Normal Played-back Picture

Picture-Searched Picture

Index Function

You can find specific scenes easily using the markings (index signals) recorded on a tape. This function is called the Index function.
You can mark an index anywhere on a tape, so that you can easily find the specific scene later on. The index works as a divider between scenes, and is not numbered. So, when you specify another index mark later, you have to specify the relative position from the current position. (The first index, the second index ... from the current position.)
You can mark index signals during playback and recording. However, you can only mark them but cannot erase them during recording.

Marking Index Signals



Whenever you mark an index, "INDEX MARK" appears on the TV screen.

Automatic index mark

An index signal is automatically marked at the beginning of a scene when you start recording.

Manual index mark

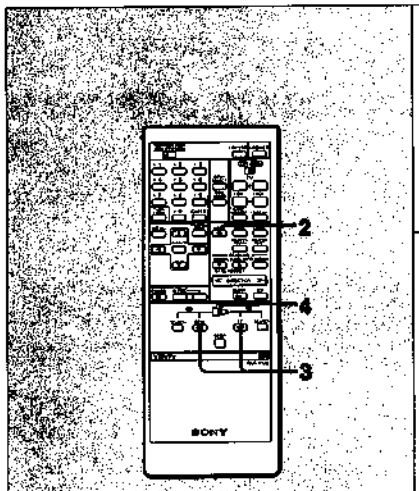
When recording or playing a tape, you can manually mark an index signal by pressing INDEX MARK on the Remote Commander.

Notes

- When marking index signals, leave an interval of at least 2 minutes between them so that the VCR can detect the index signals correctly.
- When you mark an index signal during playback, the recorded sound may be distorted or interrupted. However, there is no damage on the recording itself.
- You cannot mark an index signal in the following cases:
  - on a cassette without a safety tab;
  - on an unrecorded portion of a tape;
  - immediately before a point on the tape where the tape speed (ⅡI/ⅢE) changes;
  - when playing a tape recorded in ⅡIs or ⅢIs*SHB* mode.

Playing Back from the Index Point – Index Scan

Here's how to find and play a program you've marked with an index signal.



1 Insert an indexed cassette into the VCR.

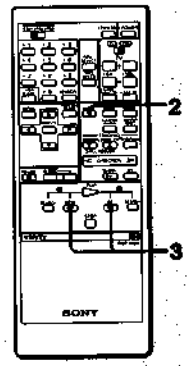
2 Press INDEX once.
"INDEX 0" and "SCAN" appear on the TV screen.

3 Press ◀◀ REW to find a previous program or ▶▶ FF to find a following program.
The index scan locates the previous or next marked index signal and plays about 10 seconds of tape prior to the signal (10-second preview). The VCR then rewinds or advances to the previous or next index signal. Every time the VCR finds an index signal, a 10-second preview begins and the displayed index number increase.

4 When you find the program you want, press ▷ PLAY.
Playback starts from that point.

Locating an Index – Index Search

Locate an index by indicating how many index signals ahead or behind the scene is from the tape's current position. You can specify up to the 19th index signal.
Here's how:



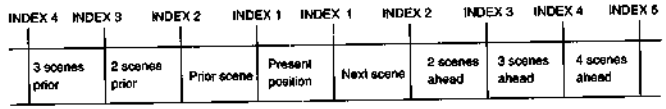
1 Insert an indexed cassette into your VCR.

2 Press INDEX repeatedly until the index number for the desired program appears on the TV screen.
The VCR exits from the index mode, if you pass index number 19.

3 Press ◀◀ REW to find a previous index or ▶▶ FF to find an upcoming index.
The tape rewinds or advances to the previous or the next index. Each time an index signal is detected, the index number on the screen decreases. When the number reaches 0, your VCR begins to play.

How to count index signals

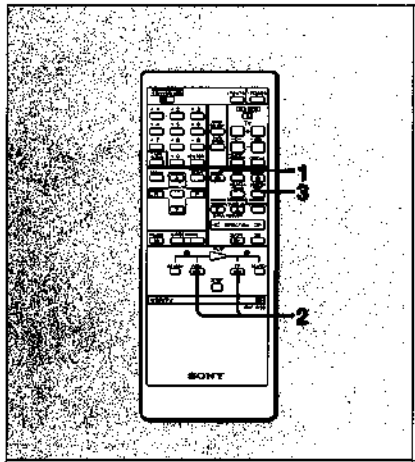
For example: if the scene you want to view is located 3 scenes ahead of the present position, display "INDEX 3" and press ▶▶ FF. On the other hand, if the scene is located 3 scenes prior to the present position, display "INDEX 4" and press ◀◀ REW.



Index Function

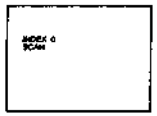
Erasing Index Signals

To remove any unwanted index signals, follow the procedure below.



2 Press ◀◀ REW to find the previous programs or ▶▶ FF to find the following programs.
The index scan locates the previous or next marked index signal and plays about 10 seconds of tape prior to the signal (10-second preview). The VCR then rewinds or advances to the previous or next index signal. Every time the VCR finds an index signal, 10-second preview begins.
This 10-second preview lets you decide whether you've located the index mark you want to erase.

1 Press INDEX once.
"INDEX 0" and "SCAN" appear on the TV screen.



3 Press INDEX ERASE during the 10-second preview.
"INDEX ERASE" appears on the TV screen.

Notes on erasing index signals

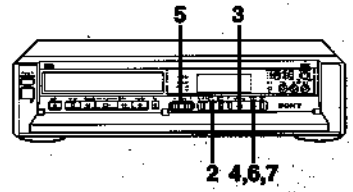
- When you erase an index signal during playback, the recorded sound may be distorted or interrupted. However, there is no damage to the recording itself.
- Press ■ STOP immediately if the played-back picture becomes distorted while erasing an index signal. Index signals marked around this portion cannot be erased. However, there is no damage to the recording.
- You cannot erase an index signal in the following cases:
  - –at the beginning of a tape;
  - –on a cassette without a safety tab;
  - –immediately after an unrecorded portion of a tape;
  - –immediately before or after a point on the tape where the tape speed (SP/LP) changes;
  - –when playing a tape recorded in SP in SHQ or SP in SHB mode;
  - –if an index signal was marked on another VCR.

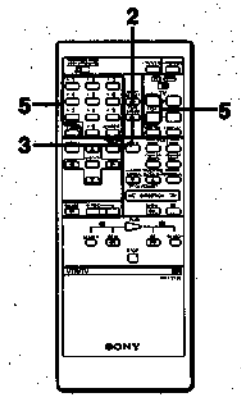
Quick-Timer Recording

This function provides you a short cut to recording programs without going through the entire timer setting procedure. You can preset the timer to record up to 5 hours in 30 minute intervals.

Note
Before you begin, make sure the clock has been set, and then that the timer recording function is turned off by checking to see that "TIMER" is not lit in the display window. If "TIMER" is lit, press TIMER REC (ON/OFF) to turn it off.

Operating Quick-Timer Recording





If your VCR is in stop mode, perform all of the following steps. If your VCR is currently recording, skip steps 1 to 6, and begin with step 7.

1 Insert a cassette into your VCR.

2 Press INPUT SELECT repeatedly so that a channel number appears in the display window.

3 Select the desired tape speed (SP/LP) by pressing TAPE SPEED.

4 Press QUICK TIMER on the VCR.
If you insert a cassette without its safety tab, your VCR will eject the cassette.

5 Select the channel you want to record using the CHANNEL +/– on the VCR or CH +/– on the Remote Commander.
You can also use channel number buttons on the Remote Commander to select the channel; however, you need to press ENTER after selecting the channel with the channel number buttons.

6 Press QUICK TIMER on the VCR again to start recording.

7 Press QUICK TIMER on the VCR until the amount of time you want to record appears in the display window.
Each time you press QUICK TIMER, the recording time increases by 30 minutes.

0:00 → 0:30 → 1:00 → 1:30 ..... 5:00

Once recording is finished, your VCR will turn off automatically.

To stop quick-timer recording
Press TIMER REC (ON/OFF) so that "TIMER" and "REC" go off in the display window.

Quick-Timer Recording

Notes

- If your tape ends during quick-timer recording, recording stops and the VCR turns off. The tape will not rewind automatically.
- If a power interruption occurs during quick-timer recording, recording will stop and your VCR will turn off. If the interruption lasts less than one hour, and the power is restored before the recording end time, recording will start again from that point.

Buttons operable during quick-timer recording

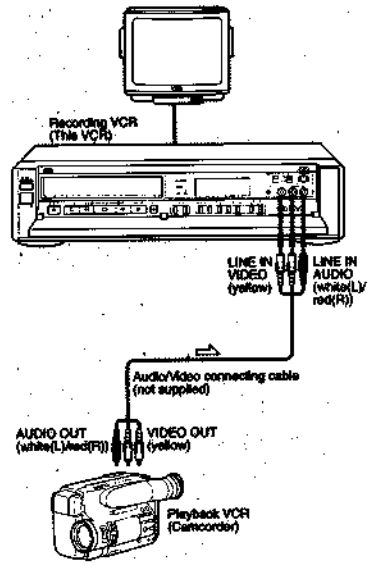
TIMER REC (ON/OFF)	To stop quick-timer recording. (See page 47.)
QUICK TIMER	To increase or decrease recording time. (See page 47.)
COUNTER RESET	(See "Indexing Tape Contents" on page 28.)
TV/VTR	(See "Watching One TV Program While Recording Another" on page 33.)
DISPLAY	(See "The On-Screen Display" on page 28.)
MENU	Only to check settings. (See "Checking the Timer Settings" on page 38.)
INDEX MARK	(See "Marking Index Signals" on page 43.)
SUPER BETA	(See "Recording TV Programs" on page 32.)

Editing

Using an additional VCR, you can record programs from one VCR to the other. Here's how.

Tape Dubbing - Editing from Another VCR

Here's how to edit from another VCR (such as an 8 mm video camera recorder for playback) when using this VCR for recording.
You can use the jacks located on the front panel (LINE IN 2) or on the back panel (LINE IN 1) even though the diagram below shows only connection to the LINE IN 2 jacks on the front panel.



Before you start:
- Select LINE 1 or LINE 2 by pressing INPUT SELECT.
- Select the tape speed (SP/LP) by pressing TAPE SPEED.

Note

If your playback VCR has an EDIT function (like the EDIT button on this VCR), this function should also be selected to avoid deterioration of picture quality.

How to edit:

1 **Insert a blank cassette into the recording VCR.**

2 **Turn on the playback VCR and insert a source cassette.**

3 **Locate the playback start point and select the playback pause mode on the playback VCR.**

4 **Locate the recording start point and select the recording pause mode on the recording VCR.**

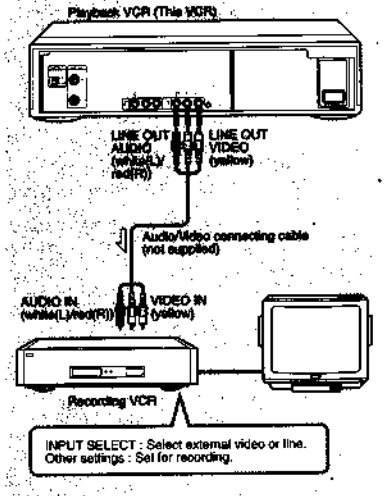
5 **Press II PAUSE on both VCRs to start recording.**
For best results, press II PAUSE on the playback VCR just before pressing II PAUSE on the recording VCR. When you've finished editing, press ■ STOP on both VCRs.

Notes

- If your playback VCR is a monaural unit:
  – For using the LINE IN 2 jacks on this VCR — use only the yellow (VIDEO) and the white (AUDIO-L) jacks. (The sound is monaural but will be recorded on both left and right channels.)
  – For using the LINE IN 1 jacks on this VCR — make connections with the VCM-910MS/920MS cable (not supplied).
- When connecting the VCRs, do not connect them so that both are used as a recording VCR and a playback VCR simultaneously. Doing so may cause a humming noise.

Tape Dubbing — Editing onto Another VCR

Here's how to use this VCR as the playback VCR and another VCR as the recording VCR.



Before you start:
- Press EDIT to light "EDIT" in the display window.
- Press DISPLAY to delete the on-screen display.
- Press SUPER BETA to match the playback condition (whether Super Beta function is on or off) of this VCR to the recording condition of the source tape.

How to edit:

1 **Turn on the recording VCR and insert a blank cassette.**

2 **Insert a source cassette into the playback VCR.**

3 **Locate the playback start point and select the playback pause mode on the playback VCR.**

4 **Locate the recording start point and select the recording pause mode on the recording VCR.**

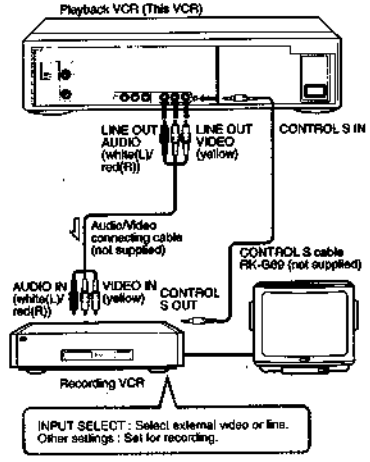
5 **Press ■ PAUSE on both VCRs to start recording.**
For best results, press II PAUSE on the playback VCR just before pressing II PAUSE on the recording VCR. When you've finished editing, press ■ STOP on both VCRs.

Notes
- If your recording VCR is a monaural unit, make connections with the VCM-910MS/920MS cable (not supplied).
- When connecting the VCRs, do not connect them so that both are used as a recording VCR and a playback VCR simultaneously. Doing so may cause a humming noise.

Synchronized Editing onto Another VCR

This VCR is equipped with the CONTROL S IN terminal. So, if the other VCR has the CONTROL S OUT terminal, you can use the SYNCHRO EDIT button on the other VCR to put both VCRs into pause mode simultaneously or release pause mode simultaneously.

The following diagram shows only how to use this VCR as the playback VCR and the other VCR having the CONTROL S OUT terminal as the recording VCR.



Before you start:
- Press EDIT to light "EDIT" in the display window.
- Press DISPLAY to delete the on-screen display.
- Press SUPER BETA to match the playback condition (whether Super Beta function is on or off) of this VCR to the recording condition of the source tape.

How to edit:

1 **Turn on the recording VCR and insert a blank cassette.**

2 **Insert a source cassette into the playback VCR.**

3 **Locate the edit start point and put the recording VCR into recording pause mode.**

4 **Locate the playback start point and put the playback VCR into playback pause mode.**

5 **Press SYNCHRO EDIT on the recording VCR.**
The recording VCR starts recording and the playback VCR starts playback simultaneously.

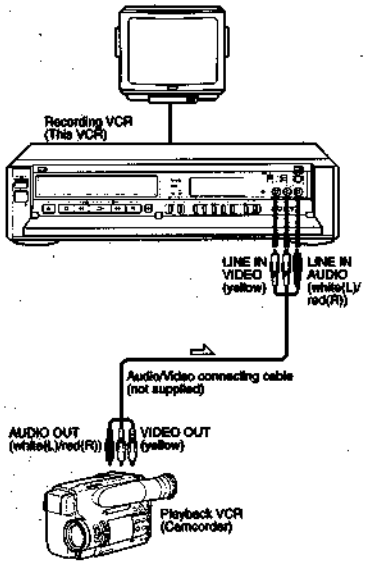
6 **At the desired edit end point, press SYNCHRO EDIT on the recording VCR again.**
The recording VCR enters recording pause mode and the playback VCR enters playback pause mode simultaneously.

Notes
- If your recording VCR is a monaural unit, make connections with the VCM-910MS/920MS cable (not supplied).
- When connecting the VCRs, do not connect them so that both are used as a recording VCR and a playback VCR simultaneously. Doing so may cause a humming noise.

Editing

Assemble Editing

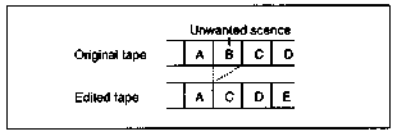
You can cut out unwanted scenes while editing from another onto this VCR.
You can use the jacks located on the front panel (LINE IN 2) or on the back panel (LINE IN 1) even though the diagram below shows only connection to the LINE IN 2 jacks on the front panel.



Before you start:
- Select LINE 1 or LINE 2 by pressing INPUT SELECT.
- Select the recording mode (SP/LP) by pressing TAPE SPEED

Note

If your playback VCR has an EDIT function (like the EDIT button on this VCR), this function should also be selected to avoid deterioration of picture quality.



How to edit:

1 Insert a blank cassette into the recording VCR.

2 Turn on the playback VCR, insert a source cassette, and start playback.

3 Record on the recording VCR while viewing the played-back picture of the playback VCR, and press II PAUSE on the recording VCR at the point you want to cut out.
The recording VCR enters recording pause mode.

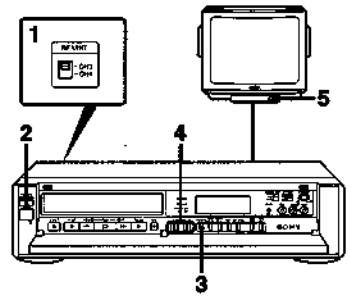
4 Press II PAUSE again to release the recording pause mode for the recording VCR.

5 Repeat 3 and 4 to cut out other unwanted scenes.

Notes
- If your playback VCR is a monaural unit:
  – For using the LINE IN 2 jacks on this VCR — use only the yellow (VIDEO) and the white (AUDIO-L) jacks. (The sound is monaural but will be recorded on both left and right channels.)
  – For using the LINE IN 1 jacks on this VCR — make connections with the VCM-910MS/920MS cable (not supplied).
- When connecting the VCRs, do not connect them so that both are used as a recording VCR and a playback VCR simultaneously. Doing so may cause a humming noise.

General Setup Information

Setting the RF UNIT Selector



Why this setting is necessary

You must set the RF UNIT selector on the back of the VCR so that your TV can receive the correct signal from the VCR. Set the selector to CH 3 or CH 4, whichever channel is not active in your area.

If you have connected a TV or color monitor equipped with A/V input jacks, you can skip this adjustment.

1 Set the RF UNIT selector on the back of the VCR to CH 3 or CH 4, whichever channel is not active in your area.

2 Press POWER.
The power lamp lights up.

3 Press TV/VTR so that "VTR" lights up in the display window.

4 Check that the channel number indicator appears in the display window, then select an active channel in your area by pressing CHANNEL +/– on the VCR (or CH +/– on the Remote Commander).

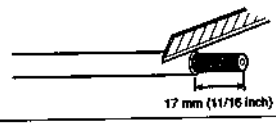
5 Turn on your TV and set it to the channel you selected in step 1 (Ch 3 or Ch 4).
Your TV is now tuned to the VCR. Whenever you use the VCR, set the TV to this channel.

Note

For details on adjusting TV channels, see your TV instruction manual.

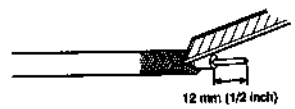
Attaching the F-Type Connector (not supplied)

1 Strip 17 mm (11/16") of the black polyvinyl jacket.



2 Fold back the woven wire.

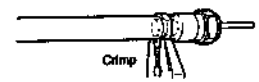
3 Strip 12 mm (1/2") of the white plastic casing, leaving 12 mm of the center conductor.



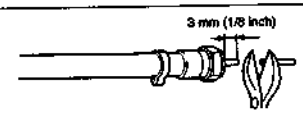
4 Slip the crimping ring over the cable.

5 Insert the liner conductor into the F-type connector shaft and push the end of the cable into the connector as far as it will go.

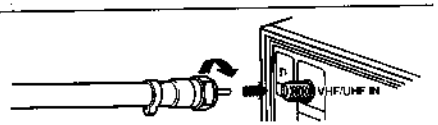
6 Slide the crimping ring over this assembly. Pinch the crimping ring with pliers to hold the connection in place.



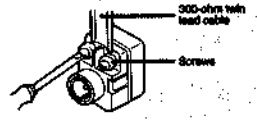
7 Cut the center conductor leaving 3 mm (1/8") from the end.



8 Insert the F-type connector into VHF/UHF IN connector on the VCR.



Attaching the External Antenna Connector (supplied)

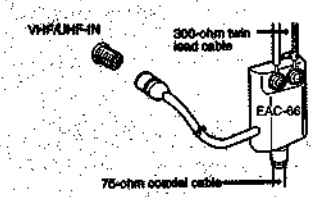


1 Loosen the screws on the antenna connector.

2 Fit the 300-ohm twin lead cable on the UHF antenna under the screws on the antenna connector.

3 Retighten the screws.

Attaching the EAC-66 U/V Band Separator/Mixer (not supplied)



1 Loosen the screws on the U/V band separator/mixer.

2 Fit the 300-ohm twin lead cable on the UHF antenna under the screws.

3 Retighten the screws.

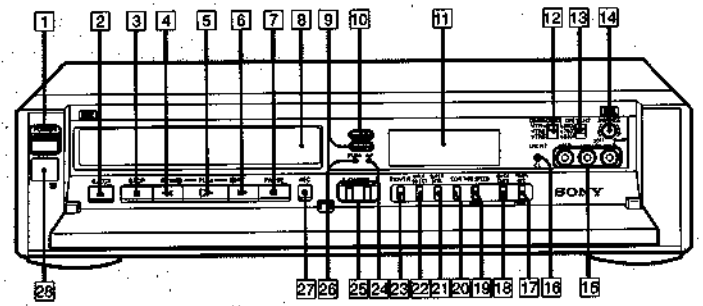
4 Connect the 75-ohm coaxial cable to the U/V band separator/mixer.

5 Connect the U/V band separator/mixer to the VHF/UHF IN connector on the VCR.

Identifying the Parts and Controls

Refer to the pages indicated for details.

Front Panel



1 **POWER (ON/OFF) switch and lamp (pages 38, 53)**

2 **⏏ EJECT button (page 26)**

3 **■ STOP button (page 27)**

4 **◀◀ REW (rewind) buttons (pages 27, 41, 44 – 46)**

5 **▷ PLAY button (page 27)**

6 **▶▶ FF (fast forward) (pages 27, 41, 44 – 46)**

7 **II PAUSE button (page 27)**

8 **Cassette compartment (page 26)**

9 **Beta Hi-Fi lamp**
Always lights up except when a tape with non-Hi-Fi recording is played back.

10 ***Super* Beta lamp (page 27)**

11 **Display window (page 58)**

12 **COMMAND MODE selector (page 17)**

13 **TAPE SELECT selector (page 29)**

14 **SHARPNESS control (page 28)**

15 **LINE IN 2 (AUDIO and VIDEO) jacks (pages 49, 52)**

16 **CL (clear) button (pages 60, 61)**

17 **TIMER REC (ON/OFF) button (pages 35, 36, 38 – 40)**

18 **QUICK TIMER button (page 47)**

19 **TAPE SPEED (II/I) button (page 32)**

20 **EDIT button (pages 49 – 52)**

21 **SUPER BETA button (page 27)**

22 **INPUT SELECT button (pages 32, 47, 49, 52)**

23 **TV/VTR button (pages 9, 11, 13, 16, 32)**

24 **SAP lamp (page 33)**

25 **CHANNEL +/– buttons (pages 21, 32)**

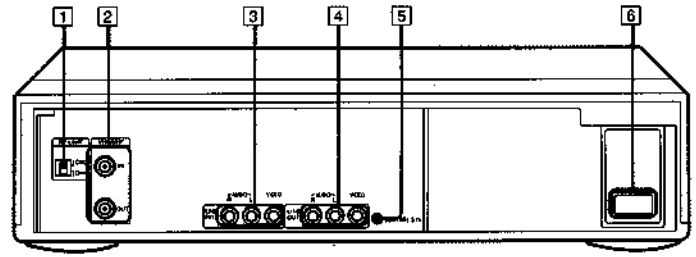
26 **STEREO lamp**
Lights up when receiving a stereo broadcast.

27 **● REC button (page 32)**

28 **Remote sensor**

Refer to the pages indicated for details.

Rear Panel



1 **RF UNIT selector (page 53)**

2 **VHF/UHF IN/OUT connectors (F-type) (pages 8 – 14, 54)**

3 **LINE IN 1 AUDIO and VIDEO jacks (phono type) (pages 49, 52)**

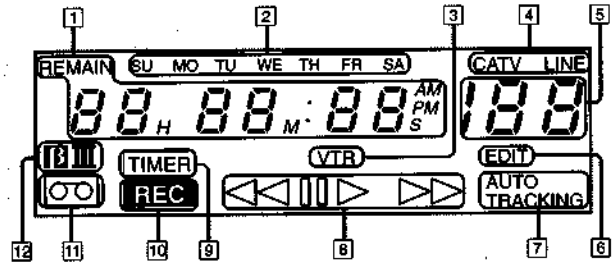
4 **LINE OUT AUDIO and VIDEO jacks (phono type) (pages 7, 50, 51)**

5 **CONTROL S IN terminal (page 51)**

6 **AC IN socket (page 6)**

Refer to the pages indicated for details.

Display Window



1 Linear time counter/remaining time/current time/ quick-timer recording time (page 28)

2 Day of the week indicator

3 VTR indicator (pages 9, 11, 13, 16, 32)

4 Input mode indicator (page 32)

5 Channel number indicator (page 32)

6 EDIT indicator (pages 50, 51)

7 AUTO TRACKING indicator (page 30)

8 Tape Operation indicators

9 TIMER indicator

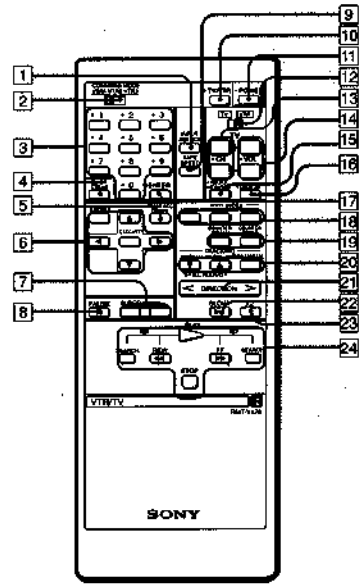
10 REC (recording) indicator

11 Cassette indicator (page 26)

12 Tape speed (recording mode) indicator

Refer to the pages indicated for details.

Remote Commander



1 INPUT SELECT button (pages 32, 47, 49, 52)

2 COMMAND MODE (VTR1/VTR2/VTR3) selector (page 17)

3 Channel number buttons* (page 32)

4 TIMER CLEAR button (page 39)

5 TIMER REC (ON/OFF) button (pages 35, 36, 38 – 40)

6 Menu screen setting buttons (pages 18 – 22, 24, 31, 34, 35, 38, 39)
MENU button
EXECUTE button
Cursor shift (∧/∨/</>) buttons

7 ● REC buttons (page 32)
Press both buttons simultaneously.

8 II PAUSE buttons (page 27)

9 TAPE SPEED button (page 32)

10 TV/VTR button* (pages 9, 11, 13, 16, 32)

11 POWER button* (pages 38, 53)

12 TV/VTR remote control selector (page 17)

13 CH (channel) +/– buttons* (pages 21, 32)

14 VOL (volume) +/– buttons
For adjusting the TV volume.

15 AUDIO MONITOR button* (pages 30, 31, 33)

16 DISPLAY button* (page 28)

17 ENTER button* (pages 21, 32)

18 Index buttons
INDEX button (pages 44 – 46)
INDEX MARK button (page 43)
INDEX ERASE button (page 46)

19 Counter buttons
COUNTER REMAIN button (page 29)
COUNTER RESET button (page 28)

20 TRACKING adjustment buttons (pages 30, 42)
NORMAL/SLOW and STILL ADJUST ▼/▲ buttons
AUTO/MANUAL button

21 < DIRECTION > button (pages 41, 42)

22 ▮▸ SLOW button (page 42)

23 X2 button (page 42)

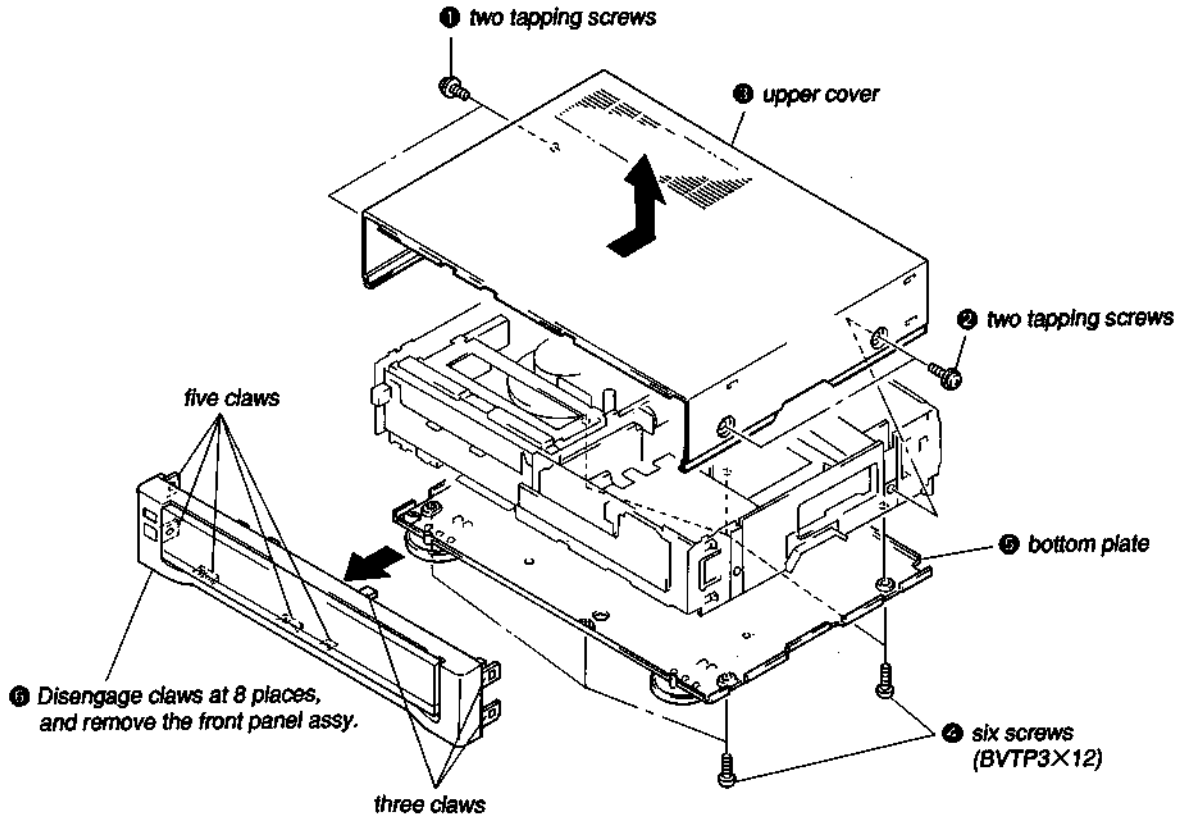
24 Tape transport buttons
▷ PLAY button (page 27)
◂◂ REW (rewind) button (pages 27, 41, 44 – 46)
▸▸ FF (fast-forward) button (pages 27, 41, 44 – 46)
⊖/⊕ SEARCH button (page 41)
■ STOP button (page 27)

* When the TV/VTR remote control selector is set to TV, you can use the buttons marked with an asterisk to control the TV.

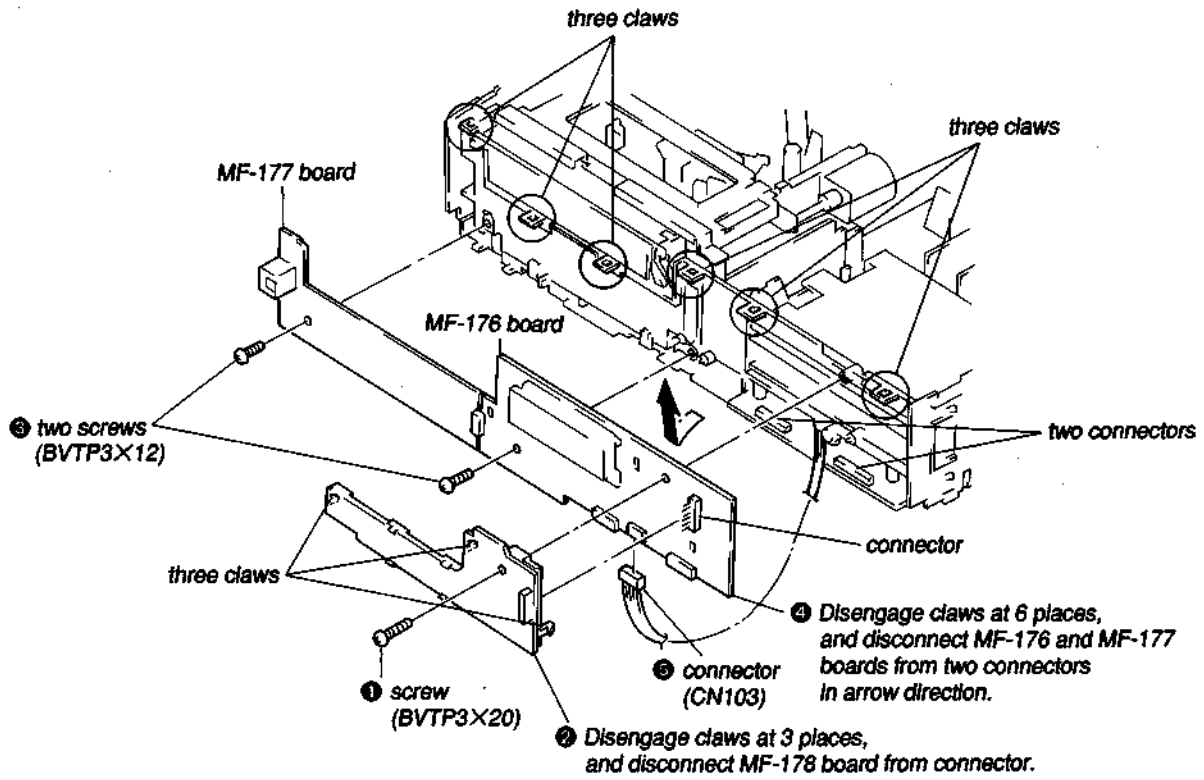
SECTION 2
DISASSEMBLY

NOTE: Follow the disassembly procedure in the numerical order given.

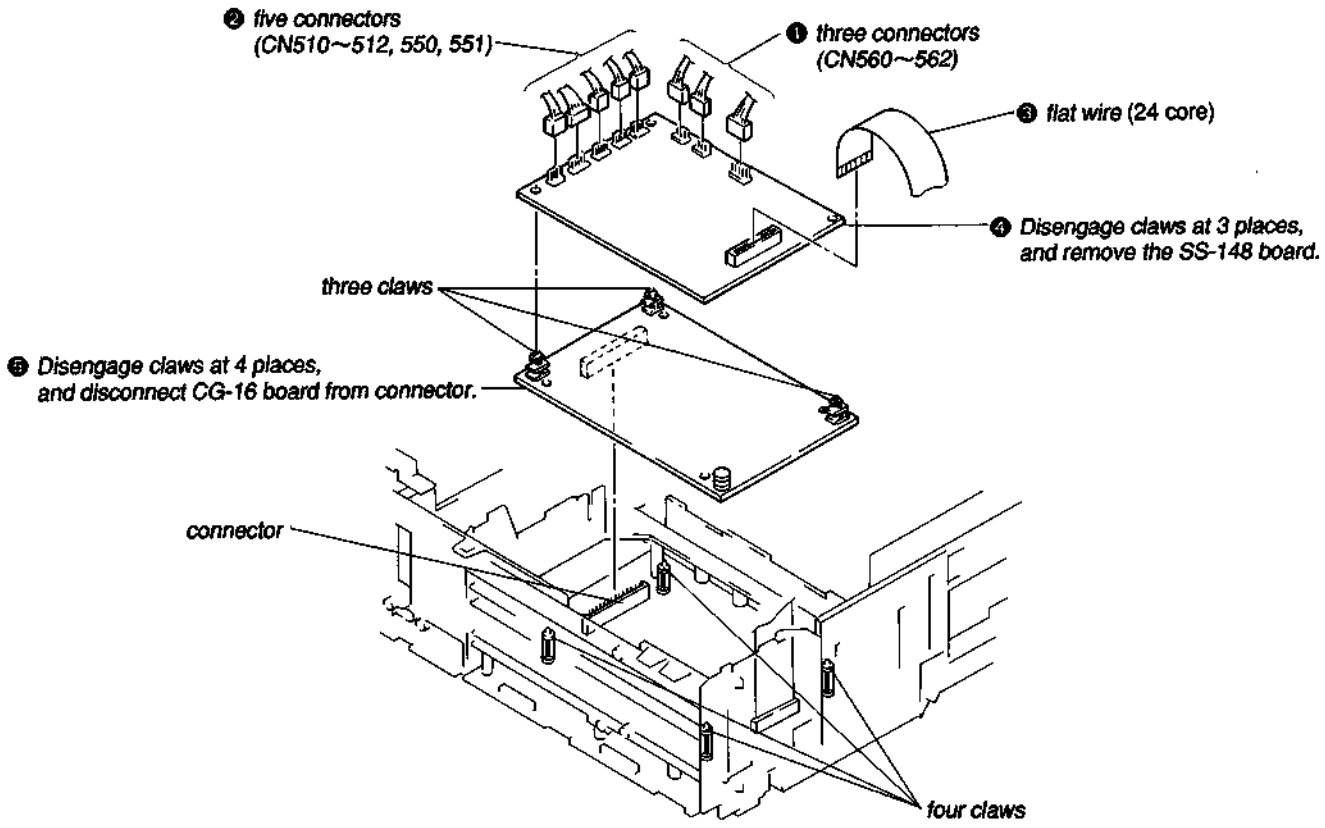
2-1. REMOVAL OF FRONT PANEL ASSEMBLY



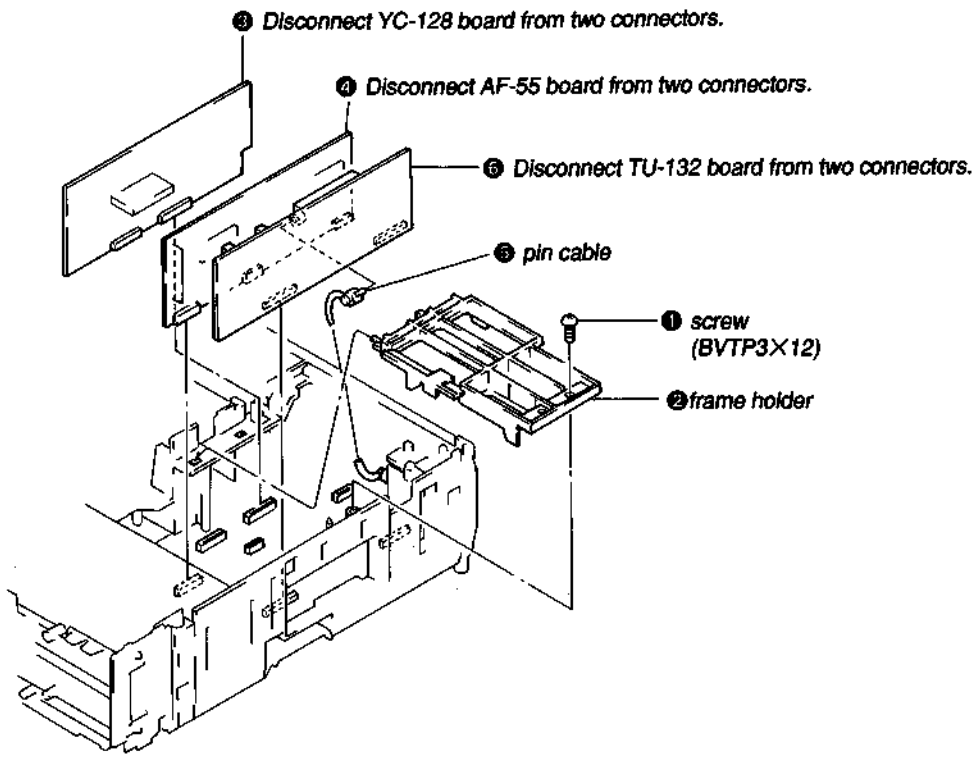
2-2. REMOVAL OF MF-176, MF-177 AND MF-178 BOARDS



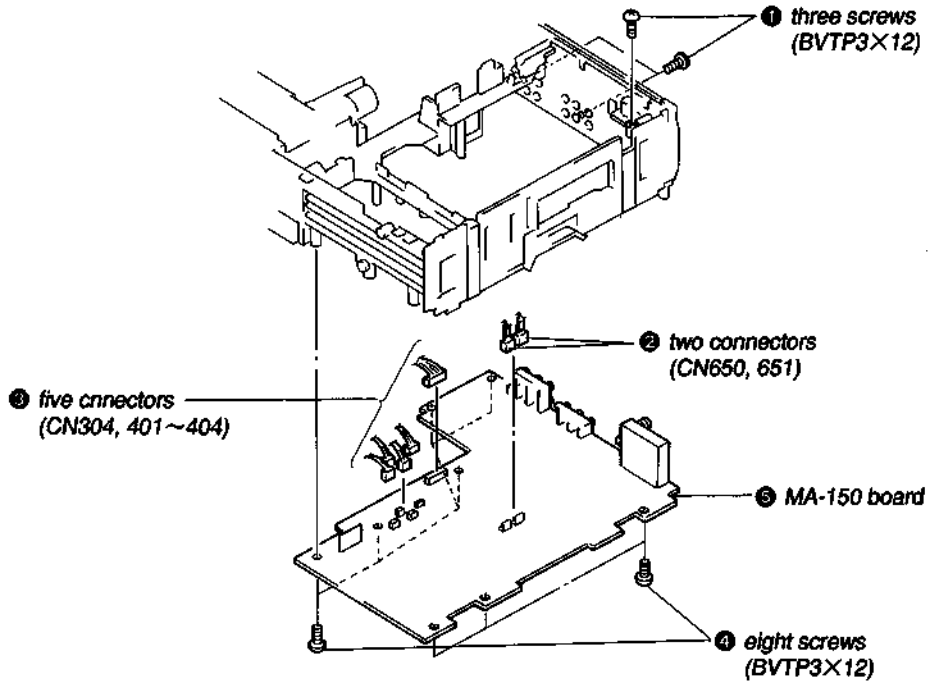
2-3. REMOVAL OF SS-148 AND CG-16 BOARDS



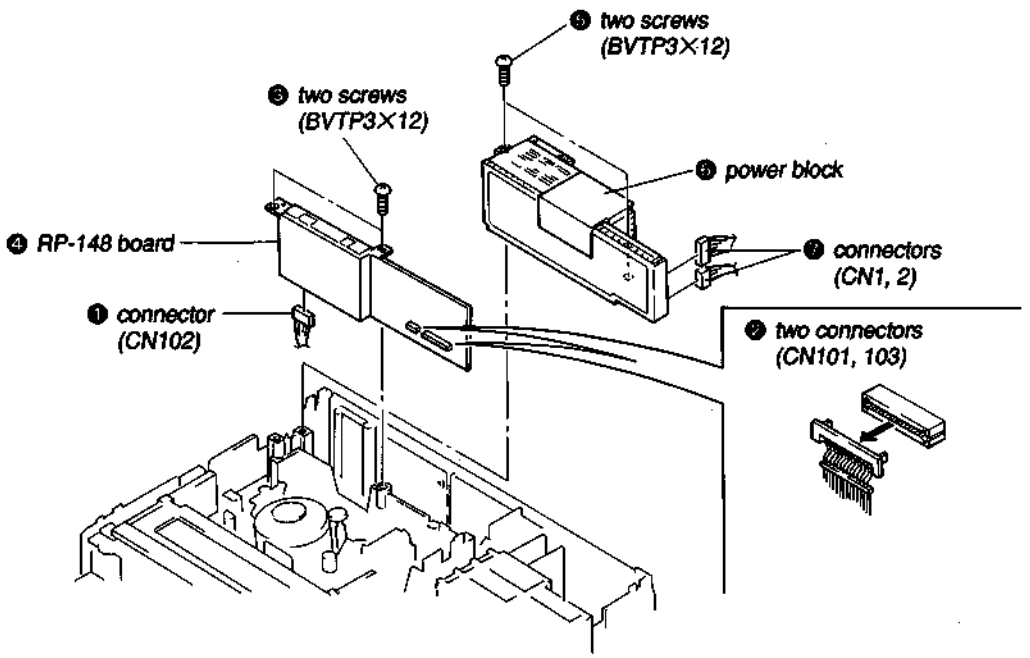
2-4. REMOVAL OF YC-128, AF-55 AND TU-132 BOARDS



2-5 REMOVAL OF MA-150 BOARD

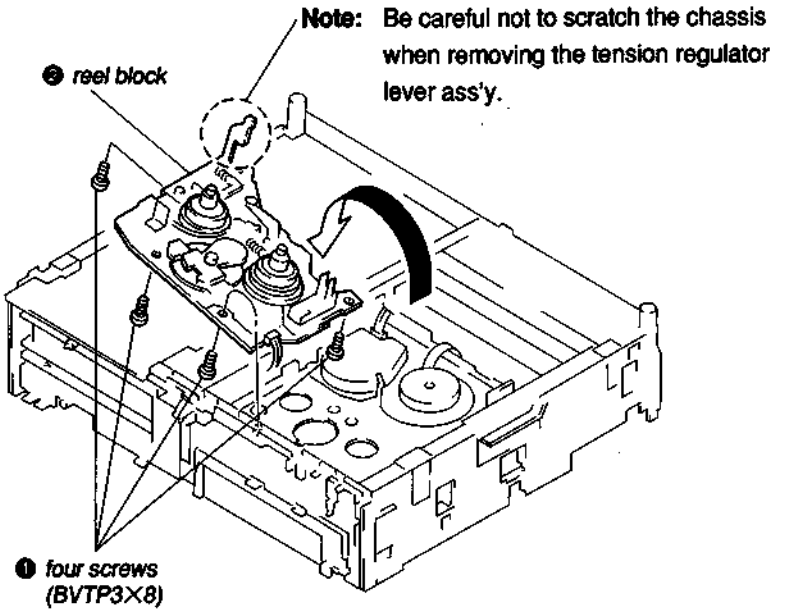


2-6. REMOVAL OF RP-148 BOARD AND POWER BLOCK

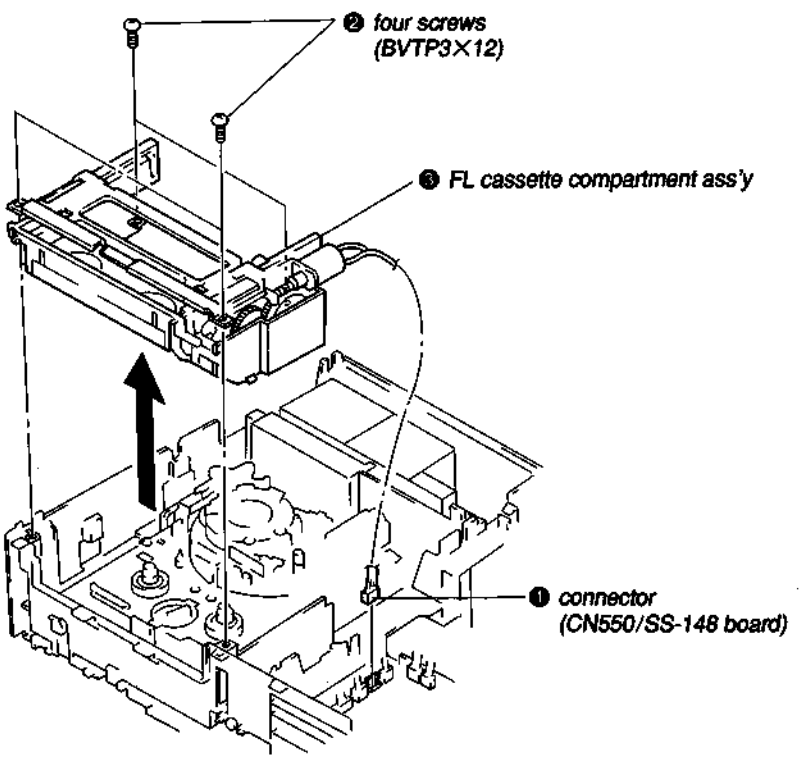


2-7. REMOVAL OF REEL BLOCK

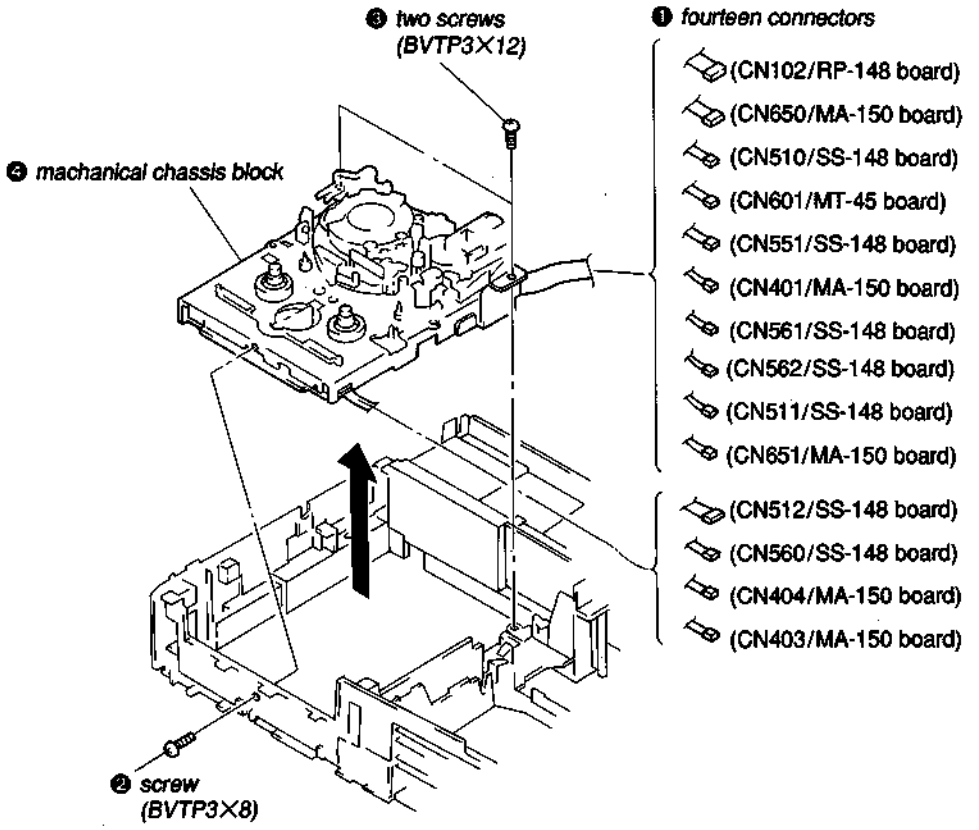
※ turn over this unit.



2-8. REMOVAL OF FL CASSETTE COMPARTMENT ASSEMBLY

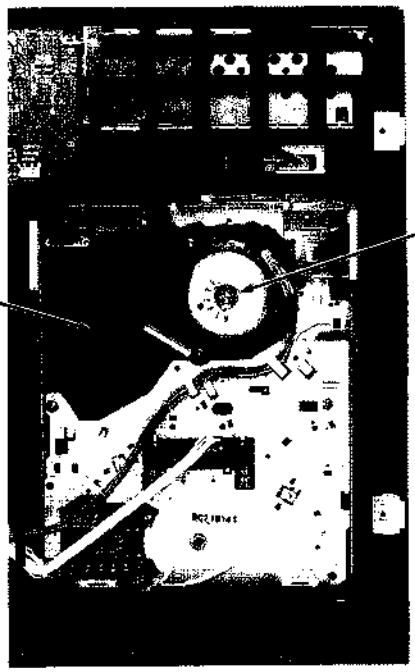


2-9. REMOVAL OF MECHANICAL CHASSIS BLOCK



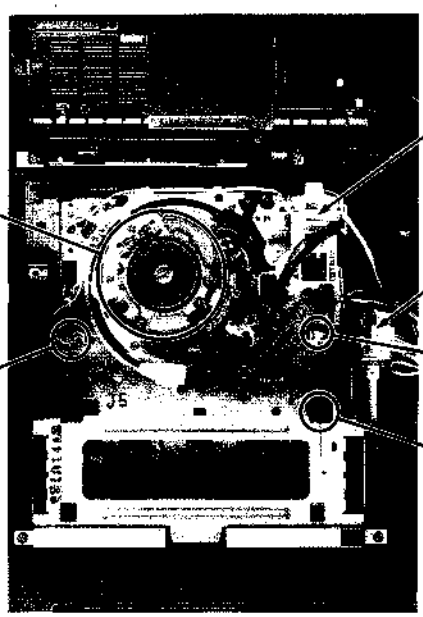
2-10. INTERNAL VIEWS

— LOWER —



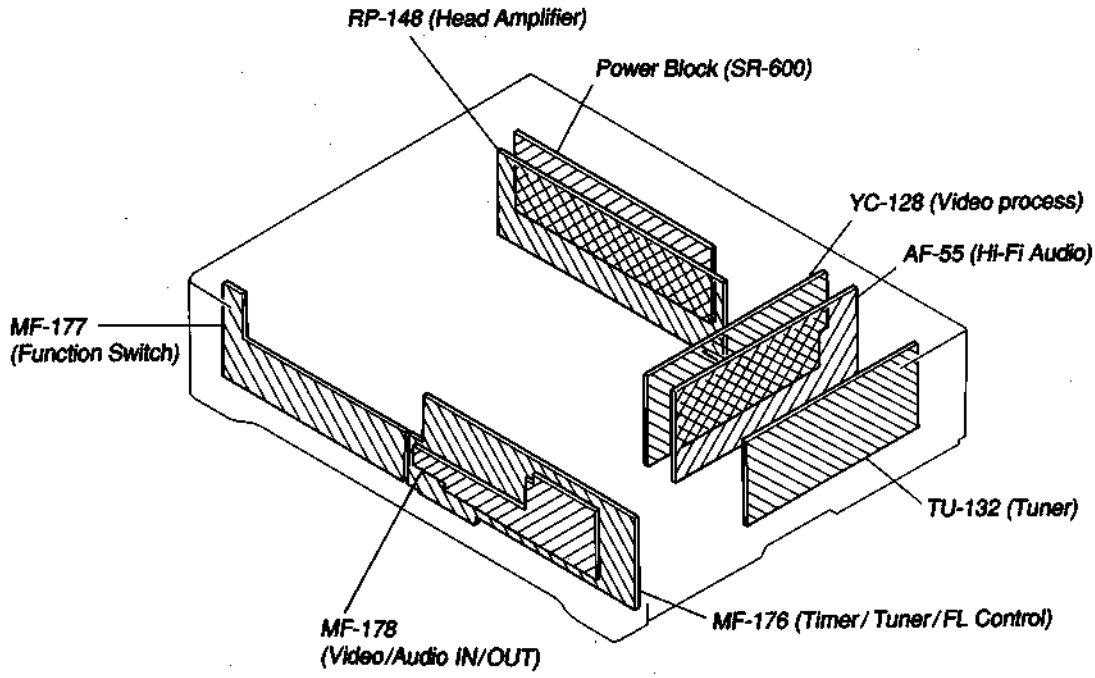
— UPPER —

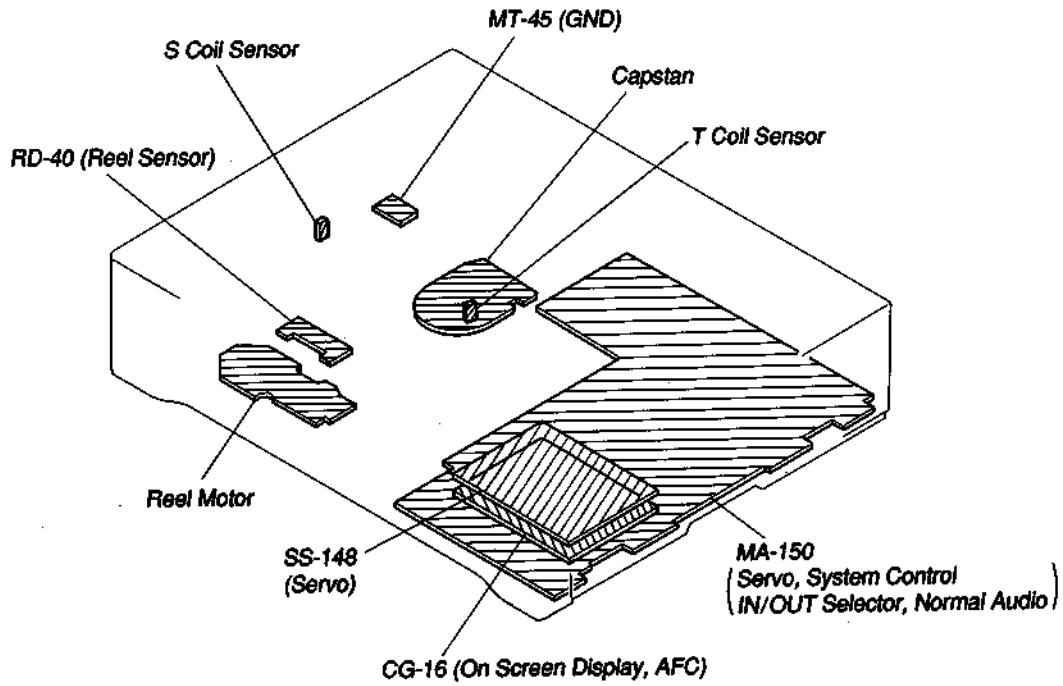
drum assy (DFH-01A-R)	A-6050-640-A
upper drum assy	A-6760-138-A
disk assy (DFR-01-R)	A-6762-378-A



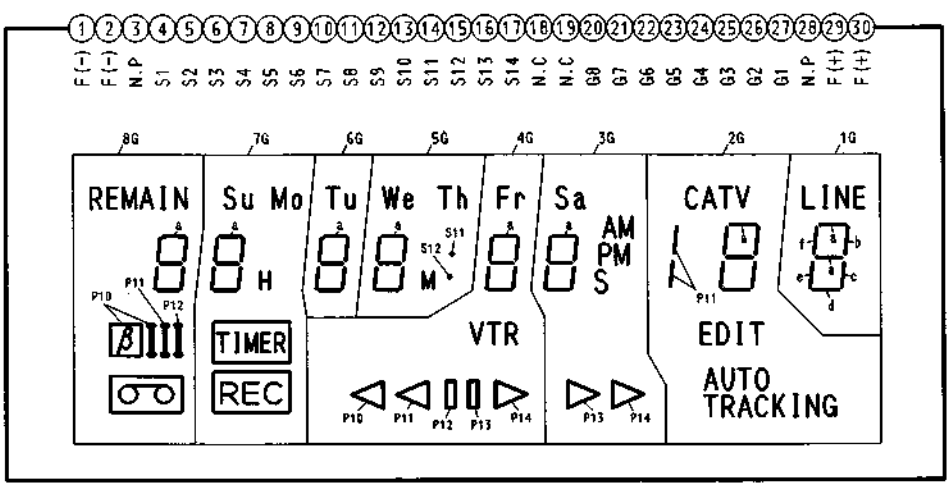
SECTION 3
DIAGRAMS

3-1. CIRCUIT BOARDS LOCATION





FL101

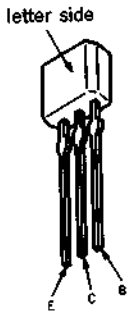


ANODE CONNECTION

	8G	7G	6G	5G	4G	3G	2G	1G
S1	REMAIN	Su	Tu	We	Fr	Sa	CATV	LINE
S2		Mo		Th	VTR	AM		
S3	a	a	a	a	a	a	a	a
S4	b	b	b	b	b	b	b	b
S5	c	c	c	c	c	c	c	c
S6	d	d	d	d	d	d	d	d
S7	e	e	e	e	e	e	e	e
S8	f	f	f	f	f	f	f	f
S9	g	g	g	g	g	g	g	g
S10	⍁ I	H			◁ (L)	PM	EDIT	
S11	I			(UPPER)	(R) ◁	S	!	
S12	I			(LOWER)	▯ (L)			
S13		TIMER		M	(R) ▯	▷ (L)		
S14	⍁	REC			▷	(R) ▷	AUTO TRACKING	

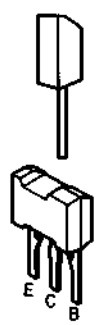
4-3. SEMICONDUCTOR LEAD LAYOUTS

2SA1175-HFE
2SC2785-HFE

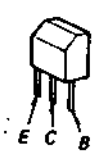


2SA733-K
2SD655-E

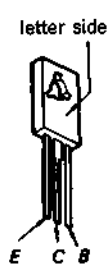
2SB1434-S



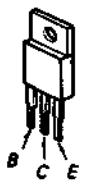
2SD773-34
2SD774-34



2SB772-Q



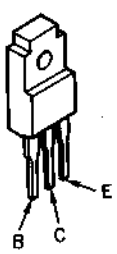
2SC2333-K



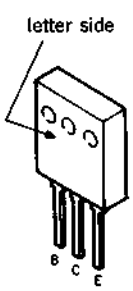
2SC3377

2SC3779C

2SD2136-P, Q, R (TA)

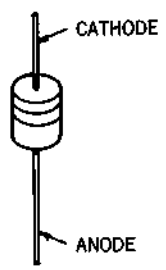


2SD2137-OP-TA

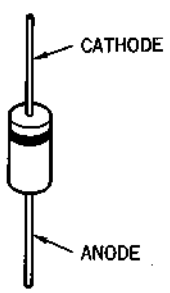


DTC114ES

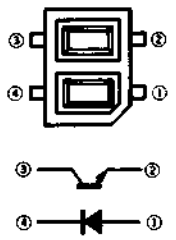
11ES2
1SS119
AG01A
AU02A
ERA82-004
HZS33NB1
MA2510
RD3.0ESB2
RD6.2ESB2
RD6.8ESB2
RD6.2ESB2
RM11C



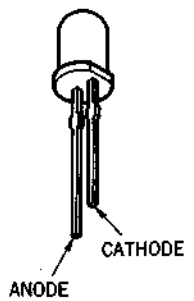
ERA81-004



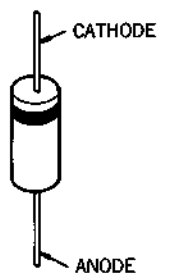
GP2S09-B



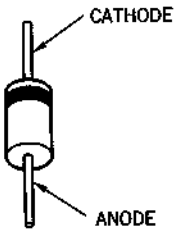
PY5504S-1



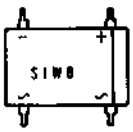
RD5.6EB2



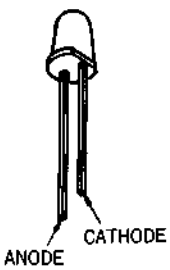
RG4Z



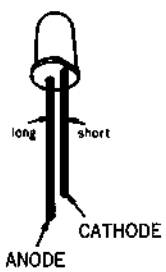
S1WBA60



SLR-34MC3
SLR-34VC3



TLY113AP



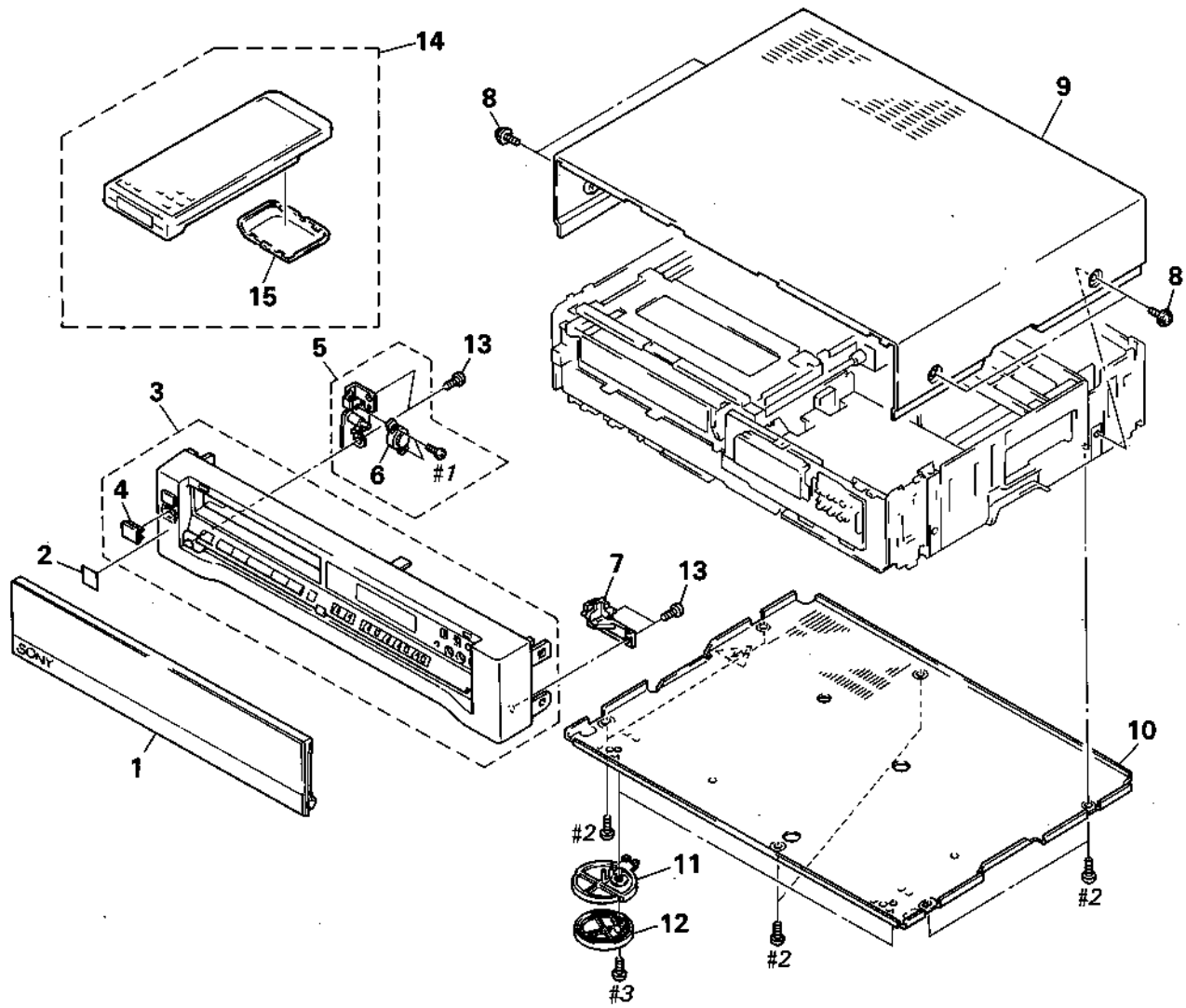
SECTION 5
EXPLODED VIEWS

NOTE:
- -XX, -X mean standardized parts, so they may have some differences from the original one.
- Items marked " * " are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- The mechanical parts with no reference number in the exploded views are not supplied.
- Hardwear (#mark) list is given in the last of this parts list.

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety. Replace only with part number specified.

Les components identifiés parune marque ⚠ sont critiques pour la sécurité.
Ne les remplacer que par unepièc portant le numéro spéccifié.

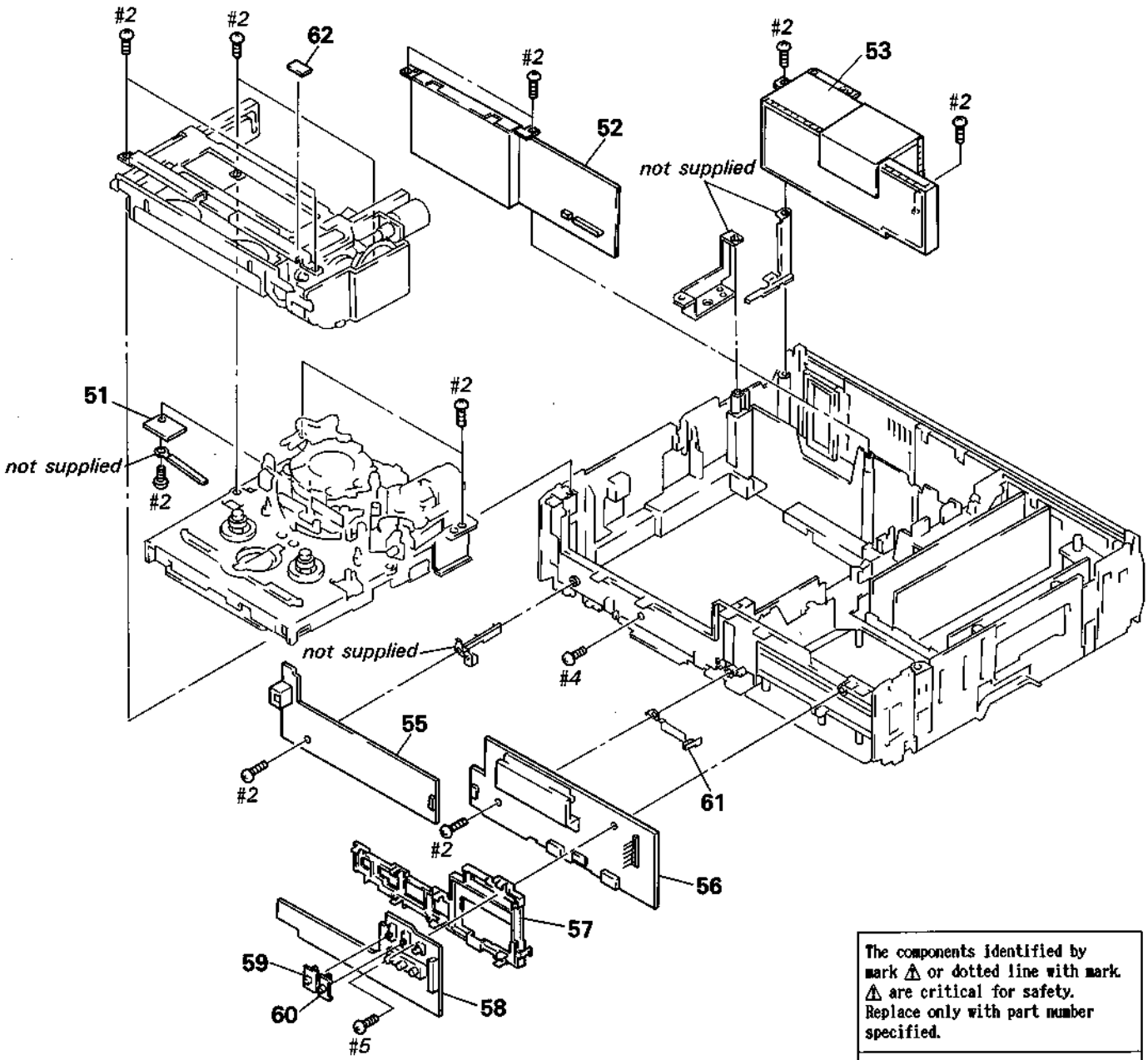
5-1. FRONT PANEL AND COVER ASSEMBLIES



Ref. No.	Part No.	Description	Remark
1	X-3942-728-1	DOOR ASSY, FRONT	
* 2	3-703-713-41	STICKER, SONY SYMBOL (10)	
3	X-3942-727-1	PANEL ASSY, FRONT	
4	3-946-620-01	FILTER, REMOTE CONTROL	
* 5	X-3942-725-1	PLATE (LEFT) BLOCK ASSY, FULCRUM	
6	3-319-224-21	DAMPER, SMALL	
7	3-951-080-01	PLATE (RIGHT), FULCRUM, DOOR	
8	3-710-901-41	SCREW, TAPPING	

Ref. No.	Part No.	Description	Remark
9	3-944-553-01	COVER, UPPER	
* 10	3-944-552-01	PLATE, BOTTOM	
11	3-953-014-01	SPACER, FOOT	
12	3-946-825-11	INSULATOR	
13	4-921-277-11	SCREW (B2.6X8), TAPPING, BIND	
14	1-466-942-11	REMOTE COMMANDER (RMT-V128)	
15	3-744-081-11	COVER, BATTERY	

5-2. CHASSIS ASSEMBLY (1)



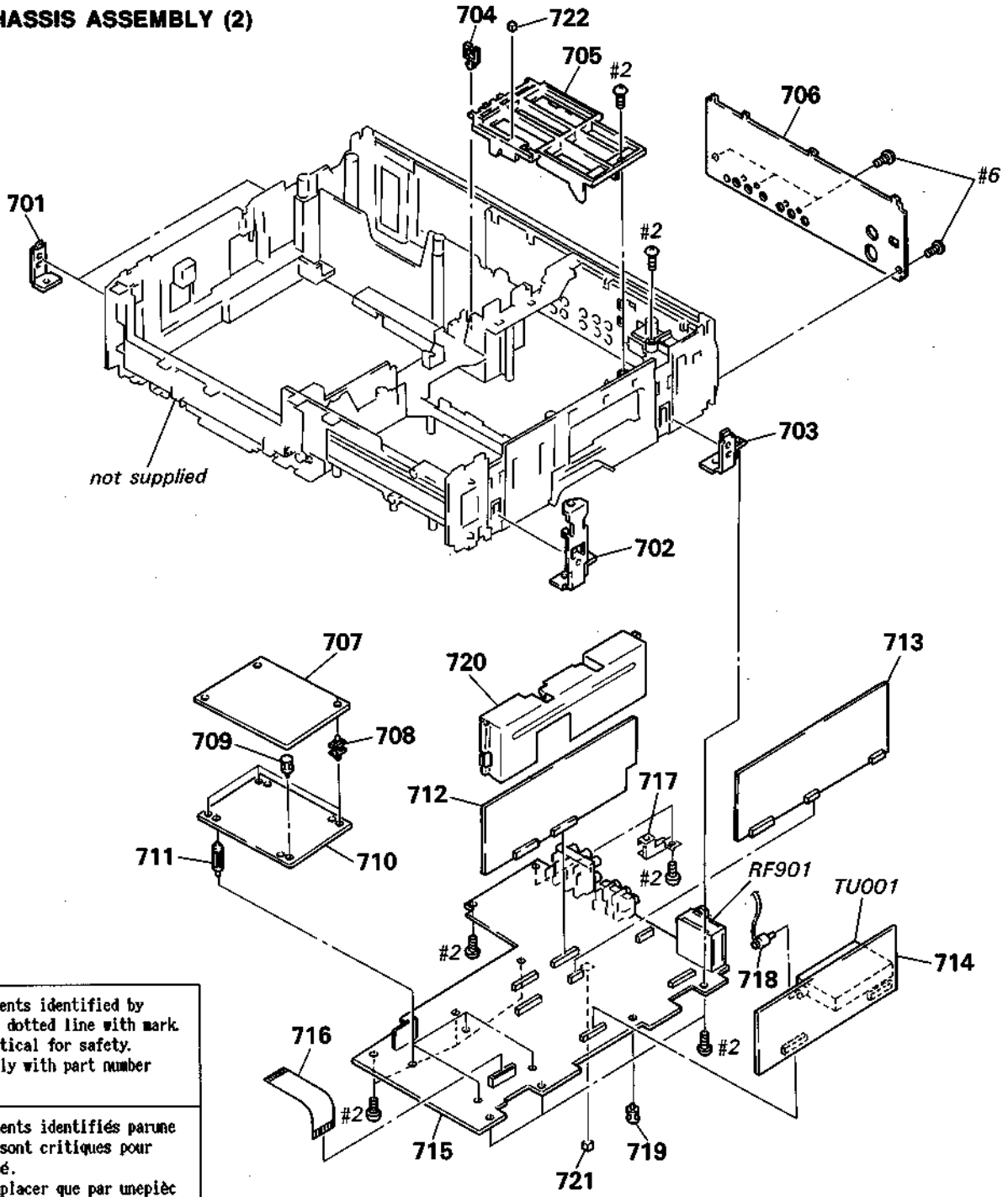
The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety. Replace only with part number specified.

Les components identifiés parune marque ⚠ sont critiques pour la sécurité.
Ne les remplacer que par unepièc portant le numéro spéccifié.

Ref. No.	Part No.	Description	Remark
* 51	A-6755-990-A	MT-45 BOARD, COMPLETE	
* 52	A-6727-491-A	RP-148 BOARD, COMPLETE	
⚠53	1-413-752-21	POWER BLOCK(SWITCHING REGULATER) (SR-600)	
* 55	A-6755-879-A	MF-177 BOARD, COMPLETE	
* 56	A-6721-537-A	MF-176 BOARD, COMPLETE (US)	
* 56	A-6721-538-A	MF-176 BOARD, COMPLETE (Canadian)	

Ref. No.	Part No.	Description	Remark
* 57	3-953-007-01	HOLDER, PC BOARD	
* 58	A-6755-878-A	MF-178 BOARD, COMPLETE	
59	3-744-217-01	KNOB, SELECTION	
60	3-953-275-01	KNOB (B), SELECTION	
* 61	3-944-614-01	PLATE, GROUND, JK	
62	9-911-838-XX	PACKING, KNOB	

5-3. CHASSIS ASSEMBLY (2)



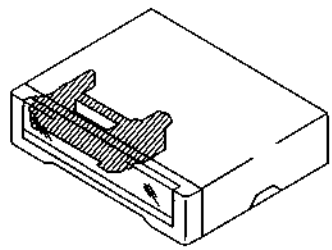
The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety. Replace only with part number specified.

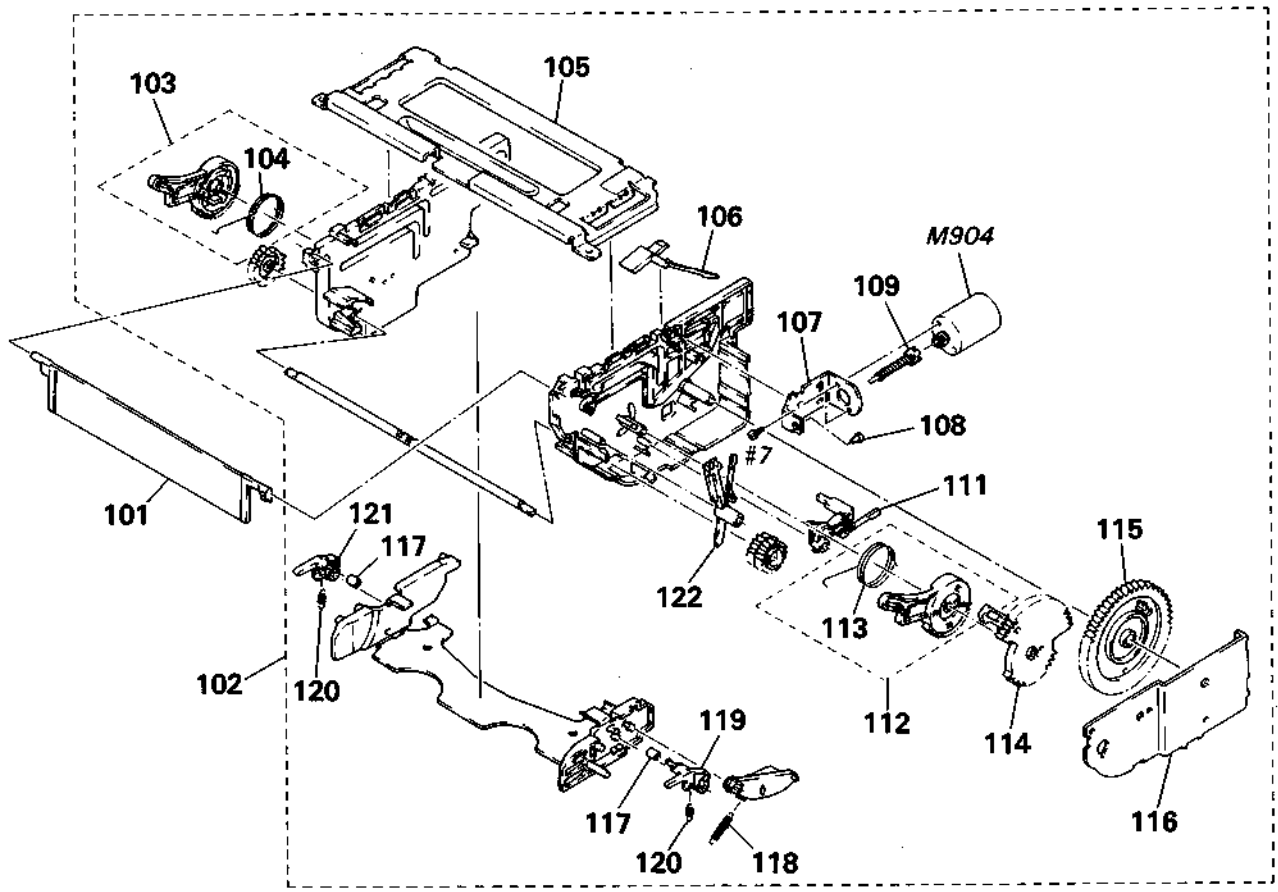
Les components identifiés parune marque ⚠ sont critiques pour la sécurité. Ne les remplacer que par unepièc portant le numéro spéccifié.

Ref. No.	Part No.	Description	Remark
* 701	3-741-992-01	STOPPER, UPPER CASE	
* 702	3-945-137-01	STOPPER (L), UPPER COVER	
* 703	3-944-544-01	STOPPER (S), UPPER COVER	
* 704	4-314-320-00	HOLDER, WIRE	
* 705	3-953-015-01	HOLDER, FRAME	
* 706	3-949-297-71	PLATE, ORNAMENTAL, JACK	
* 707	A-6754-467-A	SS-148 BOARD, COMPLETE	
* 708	3-660-828-00	HOLDER (9), PC BOARD	
709	3-682-057-21	SPACER (SMALL)	
* 710	A-6782-023-A	CG-16 BOARD, COMPLETE	
711	3-945-945-01	SUPPORT (DIA. 3), PCB	
* 712	A-6754-506-A	YC-128 BOARD, COMPLETE	

Ref. No.	Part No.	Description	Remark
* 713	A-6754-468-A	AF-55 BOARD, COMPLETE	
* 714	A-6754-426-A	TU-132 BOARD, COMPLETE	
* 715	A-6755-991-A	MA-150 BOARD, COMPLETE	
716	1-690-503-11	WIRE, FLAT TYPE (24 CORE)	
* 717	3-741-962-01	PLATE, GROUND, JMP	
718	1-555-110-00	CABLE, PIN	
719	3-682-057-11	SPACER (SMALL)	
* 720	3-953-662-01	CASE, SHIELD, YC	
721	9-911-842-XX	CUSHION, ST	
722	9-911-840-XX	CUSHION, MOTHER	
⚠RF901	1-466-150-11	MODULATOR, RF (RFU-1025)	
⚠TU001	1-465-239-21	TUNER, ET	

5-4. FRONT LOADING ASSEMBLY

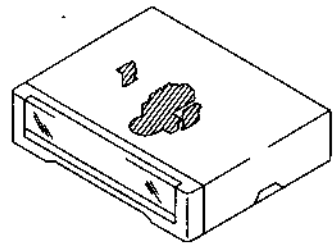


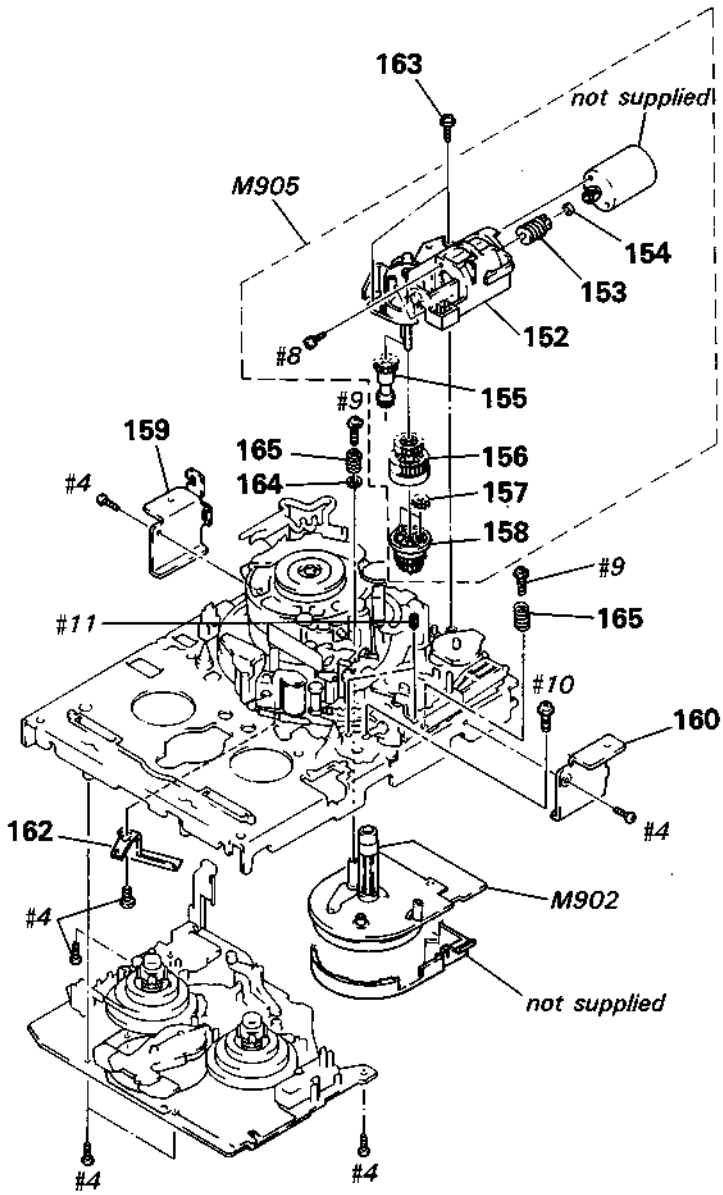


Ref. No.	Part No.	Description	Remark
101	3-749-579-02	DOOR, CASSETTE COMPARTMENT	
102	A-6751-478-A	LOADING BLOCK ASSY, FRONT	
103	A-6751-334-A	ARM (LEFT) BLOCK ASSY, DRIVING	
104	3-716-030-01	SPRING (LEFT), TORSION	
* 105	3-716-127-01	PLATE, TOP	
106	3-716-021-01	LOCK, DECK	
107	3-721-508-01	BRACKET, MOTOR	
108	3-716-144-02	RETAINER, WORM	
109	3-716-028-01	GEAR, WORM	
111	3-716-083-01	LEVER, CASSETTE IN SWITCH	
112	A-6751-335-A	ARM (RIGHT)BLOCK ASSY, DRIVING	

Ref. No.	Part No.	Description	Remark
113	3-716-029-01	SPRING (RIGHT), TORSION	
114	3-716-069-01	GEAR, DRIVING	
115	3-716-082-01	WHEEL, WORM	
116	3-716-094-01	COVER, GEAR	
117	3-716-049-02	RUBBER, CASSETTE RETAINER	
118	3-716-155-01	SPRING, TENSION	
* 119	3-716-068-01	LEVER (RIGHT), CASSETTE PRESS	
* 120	3-716-048-01	SPRING, TENSION	
* 121	3-716-090-01	LEVER (LEFT), CASSETTE PRESS	
* 122	3-716-084-02	ARM, DOOR SWITCHING	
M904	X-3716-074-1	MOTOR ASSY, L (LOADING)	

5-5. MECHANISM CHASSIS ASSEMBLY (1)



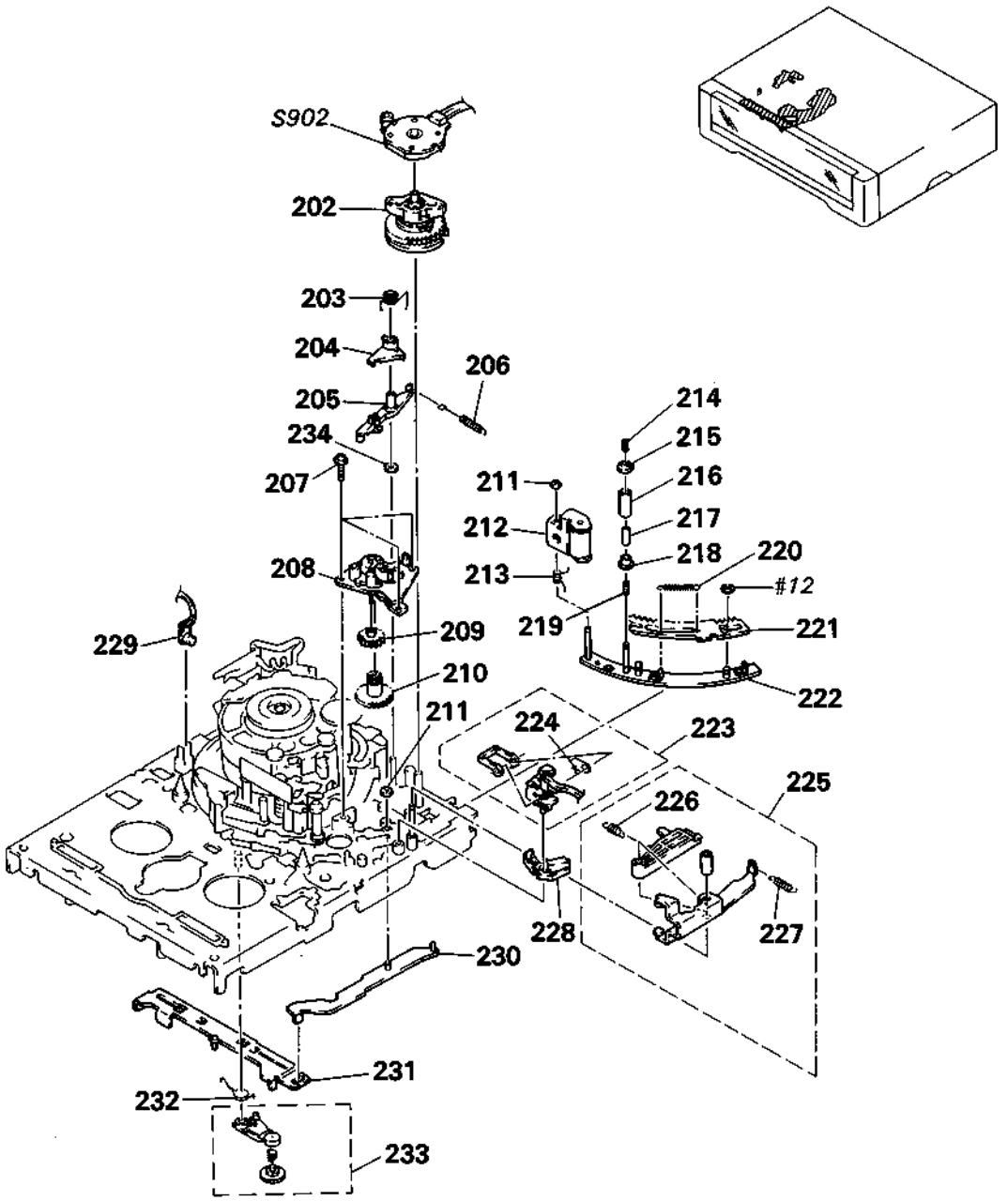


The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety. Replace only with part number specified.

Les components identifiés parune marque ⚠ sont critiques pour la sécurité.
Ne les remplacer que par unepièc portant le numéro spéccifié.

Ref. No.	Part No.	Description	Remark
152	X-3716-020-1	HOLDER ASSY, PLANET GEAR	
153	3-716-004-11	GEAR, WORM	
154	3-696-388-01	RUBBER, JOINT	
155	X-3716-012-1	GEAR ASSY, CAM RELAY	
156	X-3716-018-1	GEAR ASSY, INNER	
157	3-696-325-01	GEAR, PLANET	
158	X-3716-011-1	GEAR ASSY, DRIVING	
* 159	3-716-041-01	FOOT (LEFT), MD FITTING	
* 160	3-716-058-01	FOOT (RIGHT), MD FITTING	
* 162	3-716-182-01	RETAINER (A), ROTOR	
163	3-716-147-01	SCREW (2.6X8), TAPPING	
164	3-693-831-01	WASHER, GUIDE	
165	3-679-359-00	SPRING, COMPRESSION	
⚠M902	8-835-272-01	MOTOR, DC BHF-1921A (CAPSTAN)	
M905	A-6706-852-A	MOTOR UNIT BLOCK ASSY, L (CAM)	

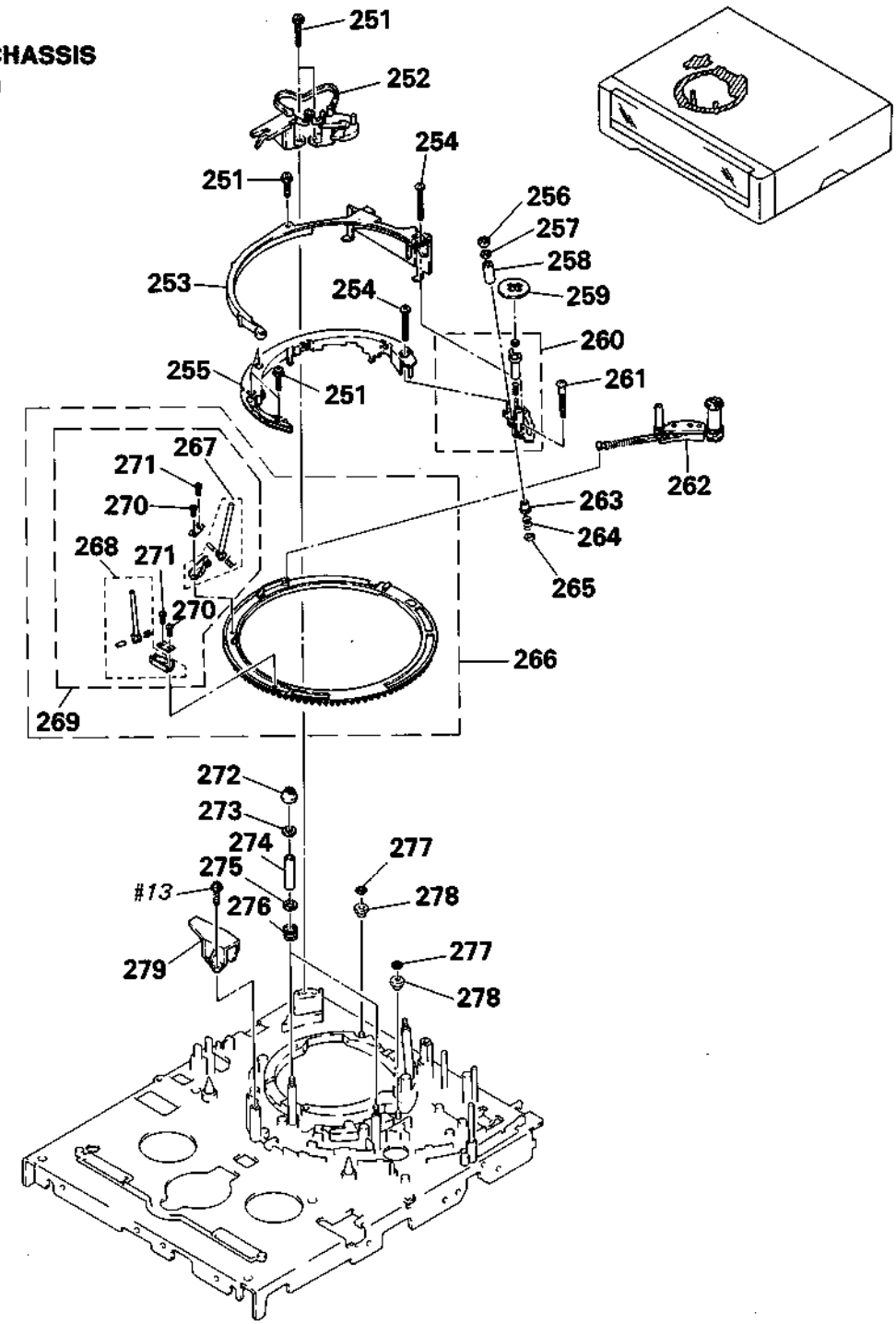
5-6. MECHANISM CHASSIS ASSEMBLY (2)



Ref. No.	Part No.	Description	Remark
202	X-3716-015-1	CAM ASSY	
203	3-696-343-01	SPRING	
204	3-696-337-01	INVERTOR, LOCK ARM	
205	X-3696-319-1	ARM ASSY, LOCK	
206	3-716-052-01	SPRING, TENSION	
207	3-716-147-01	SCREW (2.6X8), TAPPING	
208	X-3716-021-1	CHASSIS ASSY, D GEAR	
209	3-716-013-01	GEAR, T	
210	A-6750-229-A	GEAR, S	
211	3-669-596-00	WASHER (2.3), STOPPER	
212	A-6759-344-A	ARM ASSY, PINCH ROLLER	
213	3-683-441-01	SPRING	
214	3-716-163-01	SCREW, FLANGE	
215	3-676-650-00	FLANGE (UPPER) (#9), GUIDE	
216	3-676-649-11	ROLLER (#9), GUIDE	
217	3-672-559-00	SLEEVE, GUIDE	
218	3-669-432-00	FLANGE (LOWER) (#9), GUIDE	

Ref. No.	Part No.	Description	Remark
219	3-693-941-01	SPRING (#9), COMPRESSION	
220	3-549-014-00	SPRING, TENSION	
221	3-716-096-01	GEAR, T SLIDER	
222	X-3716-027-1	SLIDER (Y) ASSY, T	
223	X-3716-014-1	SENSOR ASSY, T	
224	3-716-042-01	SPRING	
225	X-3716-019-1	ARM ASSY, PINCH PRESS	
226	3-716-054-01	SPRING, TENSION	
227	3-716-051-01	SPRING, TENSION	
228	3-716-059-01	ARM, T SHUTTER	
229	1-464-781-11	SENSOR, COIL	
230	X-3716-017-1	LEVER ASSY, CAM	
231	X-3716-058-1	PLATE ASSY, SLIDE	
232	3-681-154-00	SPRING, TORSION	
233	X-3712-748-1	BRAKE ASSY (C), REVIEW	
234	3-701-438-11	WASHER, 2.5	
S902	1-571-024-11	SWITCH, ROTARY (ENCORD)	

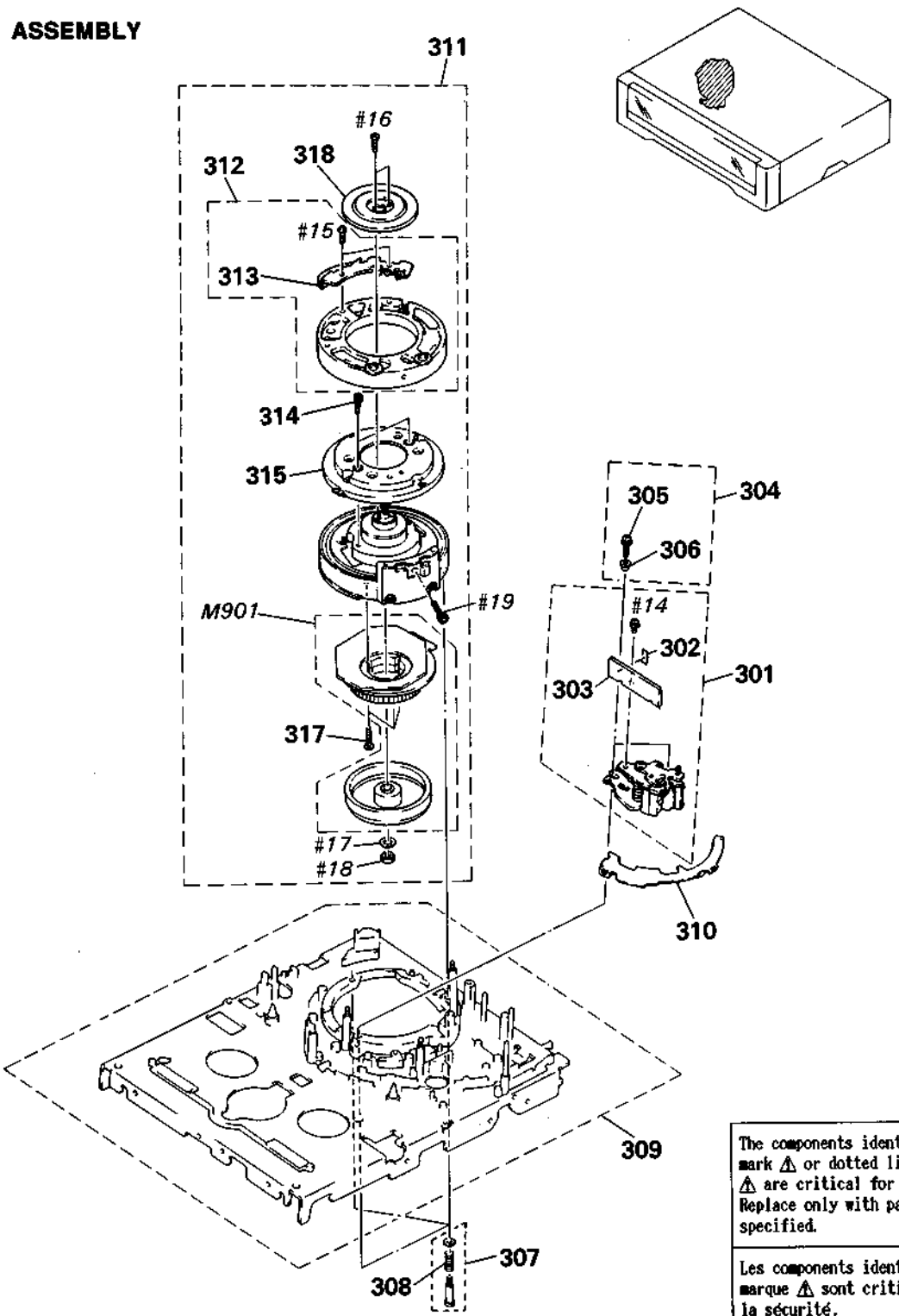
5-7. MECHANISM CHASSIS ASSEMBLY (3)



Ref. No.	Part No.	Description	Remark
251	3-716-147-01	SCREW (2.6X8), TAPPING	
252	3-716-122-01	PLATE, ADJUSTMENT	
253	3-716-128-01	GUIDE (2-Y), SHUTTLE	
254	3-730-907-01	SCREW (M2.6X25)	
255	3-716-129-01	GUIDE (1-Y), SHUTTLE	
256	3-669-446-00	NUT, GUIDE, NO. 6	
257	3-679-910-00	FLANGE (S), GUIDE, NUMBER 6	
258	3-691-830-01	SLEEVE, GUIDE, #6	
259	3-720-225-01	ROLLER (WEIGHT)	
260	A-6736-089-A	BASE BLOCK ASSY, SLANT	
261	3-669-606-00	SCREW (2.6)	
262	A-6750-227-A	SHUTTLE(6)BLOCK ASSY, THREADING	
263	3-720-221-01	SPACER	
264	3-721-333-01	SPRING, COMPRESSION	

Ref. No.	Part No.	Description	Remark
265	3-701-437-71	WASHER	
266	X-3716-029-1	RING (B3) ASSY, S	
267	X-3669-430-0	HOLDER BLOCK ASSY, #3 GUIDE	
268	X-3669-429-0	HOLDER BLOCK ASSY, #2 GUIDE	
269	A-6759-107-C	RETAINER, SPRING, LEAF	
270	3-672-586-00	SCREW (1.4X3), TAPPING	
271	3-669-478-00	SCREW (1X3), TAPPING	
272	A-6759-246-B	NUT, ADJUSTMENT, GUIDE	
273	3-684-135-01	WASHER (UPPER), GUIDE, #7, #8	
274	3-693-830-01	SLEEVE, GUIDE, #7,#8	
275	3-693-831-01	WASHER, GUIDE	
276	3-693-943-01	SPRING (#7,#8), COMPRESSION	
277	3-669-465-00	WASHER (1.5), STOPPER	
278	3-740-443-01	ROLLER (GA), RING	
279	3-716-033-01	PLATE, GUIDE	

5-8. DRUM ASSEMBLY



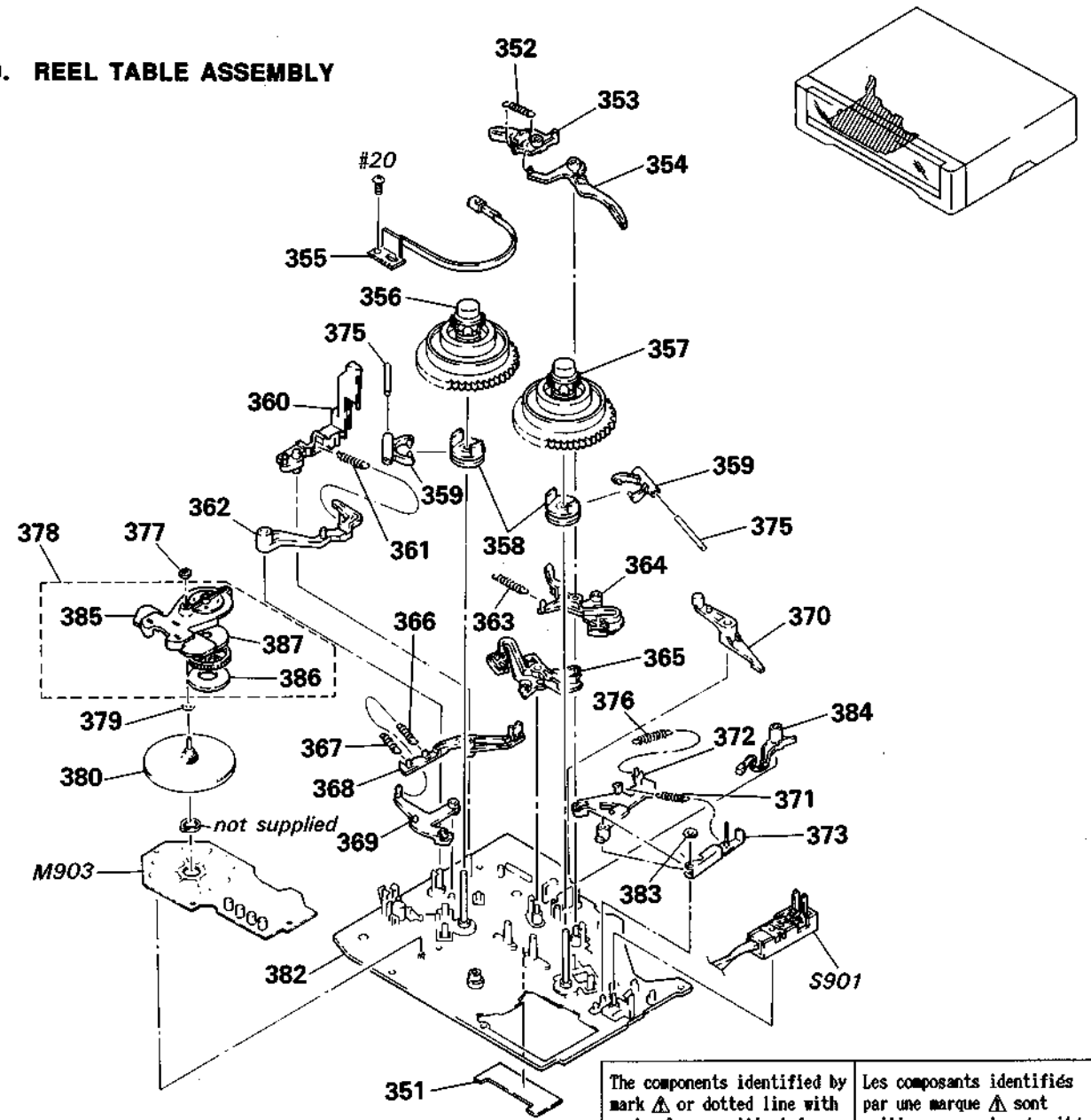
The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety. Replace only with part number specified.

Les components identifiés parune marque ⚠ sont critiques pour la sécurité. Ne les remplacer que par unepièc portant le numéro spéccifié.

Ref. No.	Part No.	Description	Remark
301	A-6761-122-A	HEAD BLOCK ASSY, ACE	
302	3-693-904-01	SHEET (P), INSULATING	
303	3-693-895-01	PROTECTOR (S)	
* 304	X-3716-033-1	SCREW ASSY, CTL	
305	3-716-146-01	SCREW (2.6X12)	
306	3-684-247-01	BUSHING, ACE	
307	X-3693-838-1	SCREW ASSY, FITTING	
308	3-429-123-00	SPRING (DRUM), COMPRESSION	
* 309	X-3716-067-1	CHASSIS ASSY, MECHANICAL	

Ref. No.	Part No.	Description	Remark
* 310	3-716-073-01	RECLINER, PIN	
⚠311	A-6050-640-A	DRUM ASSY (DFH-01A-R)	
312	A-6760-138-A	DRUM SUB ASSY, UPPER	
313	A-6760-066-B	SPRING ASSY, TAPE RETAINER	
314	3-669-157-00	BOLT (WASHER) (2.6X8)	
315	A-6762-378-A	DISK ASSY (DFR-01-R)	
317	3-720-811-01	SCREW (M2X12)	
318	X-3720-811-1	DAMPER (F) ASSY	
M901	1-541-615-22	MOTOR, DC (F20FL50)	

5-9. REEL TABLE ASSEMBLY



The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety. Replace only with part number specified.	Les composants identifiés par une marque ⚠ sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

Ref. No.	Part No.	Description	Remark
* 351	1-636-415-11	RD-40 BOARD	
352	3-720-216-01	SPRING, TENSION	
353	3-720-238-01	ARM, S SOFT BRAKE	
354	X-3712-724-1	BRAKE ASSY, T SOFT	
355	X-3696-356-1	BAND ASSY, TENSION REGULATOR	
356	X-3718-530-1	TABLE ASSY (D), REEL, S	
357	X-3718-531-1	TABLE ASSY (D), REEL, T	
* 358	3-696-386-01	RING, UD	
* 359	3-691-650-01	ARM, UD	
360	X-3696-312-1	LEVER ASSY, TENSION REGULATOR	
* 361	3-716-152-01	SPRING, TENSION	
362	3-716-072-01	LEVER, FUNCTION	
363	3-696-395-01	SPRING, TENSION	
364	X-3696-311-4	BRAKE ASSY, T	
365	X-3696-310-4	BRAKE ASSY, S	
366	3-691-776-01	SPRING, TENSION	
367	3-696-394-01	SPRING, TENSION	
* 368	3-696-478-01	DETECTOR, S CLUTCH	
* 369	3-696-437-01	LEVER, S LIMITER	

Ref. No.	Part No.	Description	Remark
370	X-3716-002-1	SENSOR ASSY, RING	
371	3-696-398-01	SPRING, TENSION	
* 372	3-691-728-01	LEVER, RD	
* 373	X-3691-601-3	ARM ASSY, RD	
* 375	3-691-681-01	SHAFT, ARM, UD	
376	3-696-397-01	SPRING, TENSION	
377	3-669-595-00	WASHER (2), STOPPER	
378	A-6759-074-P	ARM BLOCK ASSY, PENDULUM	
379	3-679-318-00	WASHER, PENDULUM ARM	
380	X-2622-205-1	ROTOR ASSY, R	
* 382	X-3696-336-1	CHASSIS ASSY, SUB	
383	3-574-822-00	WASHER, STOPPER	
384	3-696-438-01	ARM, PENDULUM STOPPER	
385	3-682-683-00	BALANCER, PENDULUM	
386	3-307-313-00	PLATE, YOKE	
387	3-679-379-11	SPACER, PENDULUM	
⚠M903	A-4910-063-B	REEL MOTOR BOARD, COMPLETE	
S901	1-571-023-11	SWITCH, LEAF (2 GANG) (C DOWN, C ON/REC PROOF)	

SL-HF2000

AF-55

SECTION 6
ELECTRICAL PARTS LIST

NOTE:

- Due to standardization, replacements in the parts list may be different from the parts specified in the diagrams or the components used on the set.
- -XX and -X mean standardized parts, so they may have some difference from the original one.
- RESISTORS
  All resistors are in ohms.
  METAL:Metal-film resistor.
  METAL OXIDE: Metal oxide-film resistor.
  F:nonflammable
- Items marked "*" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- SEMICONDUCTORS
  In each case, u:μ, for example:
  uA..: μA.. uPA..: μPA..
  uPB..: μPB.. uPC..: μPC.. uPD..: μPD..
- CAPACITORS
  uF: μF
- COILS
  uH: μH

When indicating parts by reference number, please include the board.

The components identified by mark ⚠ or dotted line with mark. ⚠ are critical for safety.
Replace only with part number specified.

Les composants identifiés par une marque ⚠ sont critiques pour la sécurité.
Ne les remplacer que par une pièce portant le numéro spécifié.

Ref.No.	Part No.	Description			Remark
*	A-6754-468-A	AF-55 BOARD, COMPLETE			
		**********			
		(Ref.No 2,000 Series)			
		< CAPACITOR >			
C013	1-124-034-51	ELECT	33uF	20%	16V
C019	1-124-916-11	ELECT	22uF	20%	63V
C026	1-124-126-00	ELECT	47uF	20%	10V
C027	1-163-029-11	CERAMIC CHIP	0.0047uF		50V
C028	1-124-471-00	ELECT	1000uF	20%	6.3V
C029	1-124-290-00	ELECT	47uF	20%	10V
C031	1-163-095-00	CERAMIC CHIP	12PF	5%	50V
C032	1-130-485-00	MYLAR	0.015uF	5%	50V
C033	1-163-086-00	CERAMIC CHIP	3PF		50V
C034	1-130-485-00	MYLAR	0.015uF	5%	50V
C035	1-130-498-00	MYLAR	0.18uF	5%	50V
C036	1-163-809-11	CERAMIC CHIP	0.047uF	10%	25V
C037	1-130-469-00	MYLAR	680PF	5%	50V
C038	1-163-086-00	CERAMIC CHIP	3PF		50V
C039	1-130-475-00	MYLAR	0.0022uF	5%	50V
C040	1-130-493-00	MYLAR	0.068uF	5%	50V
C041	1-163-023-00	CERAMIC CHIP	0.015uF	5%	50V
C042	1-124-903-11	ELECT	1uF	20%	50V
C043	1-124-907-11	ELECT	10uF	20%	50V
C047	1-124-126-00	ELECT	47uF	20%	10V
C050	1-163-029-11	CERAMIC CHIP	0.0047uF		50V
C051	1-163-029-11	CERAMIC CHIP	0.0047uF		50V
C053	1-124-916-11	ELECT	22uF	20%	63V
C054	1-163-029-11	CERAMIC CHIP	0.0047uF		50V
C056	1-123-382-00	ELECT	3.3uF	20%	100V
C057	1-123-382-00	ELECT	3.3uF	20%	100V
C058	1-163-029-11	CERAMIC CHIP	0.0047uF		50V
C059	1-163-029-11	CERAMIC CHIP	0.0047uF		50V
C060	1-163-029-11	CERAMIC CHIP	0.0047uF		50V
C061	1-163-029-11	CERAMIC CHIP	0.0047uF		50V
C064	1-163-029-11	CERAMIC CHIP	0.0047uF		50V
C065	1-126-101-11	ELECT	100uF	20%	16V
C066	1-163-029-11	CERAMIC CHIP	0.0047uF		50V
C067	1-124-442-00	ELECT	330uF	20%	6.3V
C099	1-124-126-00	ELECT	47uF	20%	10V
C103	1-124-288-00	ELECT	22uF	20%	10V
C104	1-130-497-00	MYLAR	0.15uF	5%	50V
C105	1-130-497-00	MYLAR	0.15uF	5%	50V
C107	1-124-288-00	ELECT	22uF	20%	10V
C109	1-163-029-11	CERAMIC CHIP	0.0047uF		50V
C110	1-163-029-11	CERAMIC CHIP	0.0047uF		50V
C111	1-163-029-11	CERAMIC CHIP	0.0047uF		50V
C112	1-163-029-11	CERAMIC CHIP	0.0047uF		50V
C113	1-124-916-11	ELECT	22uF	20%	63V
C114	1-163-029-11	CERAMIC CHIP	0.0047uF		50V
C115	1-124-126-00	ELECT	47uF	20%	10V
C116	1-124-916-11	ELECT	22uF	20%	63V
C213	1-124-034-51	ELECT	33uF	20%	16V
C219	1-124-916-11	ELECT	22uF	20%	63V
C226	1-124-126-00	ELECT	47uF	20%	10V
C227	1-163-029-11	CERAMIC CHIP	0.0047uF		50V
C228	1-124-471-00	ELECT	1000uF	20%	6.3V
C229	1-124-290-00	ELECT	47uF	20%	10V
C231	1-163-095-00	CERAMIC CHIP	12PF	5%	50V
C232	1-130-485-00	MYLAR	0.015uF	5%	50V
C233	1-163-086-00	CERAMIC CHIP	3PF		50V
C234	1-130-485-00	MYLAR	0.015uF	5%	50V
C235	1-130-498-00	MYLAR	0.18uF	5%	50V
C236	1-163-809-11	CERAMIC CHIP	0.047uF	10%	25V
C237	1-130-469-00	MYLAR	680PF	5%	50V
C238	1-163-086-00	CERAMIC CHIP	3PF		50V
C239	1-130-475-00	MYLAR	0.0022uF	5%	50V
C240	1-130-493-00	MYLAR	0.068uF	5%	50V
C241	1-163-023-00	CERAMIC CHIP	0.015uF	5%	50V
C242	1-124-903-11	ELECT	1uF	20%	50V
C243	1-124-907-11	ELECT	10uF	20%	50V
C244	1-163-029-11	CERAMIC CHIP	0.0047uF		50V
C245	1-126-176-11	ELECT	220uF	20%	10V
C247	1-124-126-00	ELECT	47uF	20%	10V
C250	1-163-029-11	CERAMIC CHIP	0.0047uF		50V
C251	1-163-029-11	CERAMIC CHIP	0.0047uF		50V
C253	1-124-916-11	ELECT	22uF	20%	63V
C254	1-163-029-11	CERAMIC CHIP	0.0047uF		50V
C256	1-123-382-00	ELECT	3.3uF	20%	100V
C257	1-123-382-00	ELECT	3.3uF	20%	100V

Ref. No.	Part No.	Description			Remark
C258	1-163-029-11	CERAMIC CHIP	0.0047uF		50V
C259	1-163-029-11	CERAMIC CHIP	0.0047uF		50V
C260	1-163-029-11	CERAMIC CHIP	0.0047uF		50V
C261	1-163-029-11	CERAMIC CHIP	0.0047uF		50V
C299	1-124-126-00	ELECT	47uF	20%	10V
C401	1-163-017-00	CERAMIC CHIP	0.0047uF	5%	50V
C402	1-163-215-00	CERAMIC CHIP	0.0027uF	5%	50V
C403	1-124-907-11	ELECT	10uF	20%	50V
C404	1-163-215-00	CERAMIC CHIP	0.0027uF	5%	50V
C405	1-163-141-00	CERAMIC CHIP	0.001uF	5%	50V
C406	1-163-141-00	CERAMIC CHIP	0.001uF	5%	50V
C410	1-126-176-11	ELECT	220uF	20%	10V
C421	1-124-907-11	ELECT	10uF	20%	50V
C422	1-124-907-11	ELECT	10uF	20%	50V
C504	1-126-176-11	ELECT	220uF	20%	10V
C505	1-124-472-11	ELECT	470uF	20%	10V
CG01	1-163-038-00	CERAMIC CHIP	0.1uF		25V
CG02	1-163-038-00	CERAMIC CHIP	0.1uF		25V
		< CONNECTOR >			
* CN001	1-573-825-11	CONNECTOR, BOARD TO BOARD 11P			
* CN002	1-573-821-11	CONNECTOR, BOARD TO BOARD 7P			
* CN003	1-573-819-11	CONNECTOR, BOARD TO BOARD 5P			
		< COMPOSITION CIRCUIT BLOCK >			
CP001	1-217-658-11	JUMPER, ADJUSTABLE 0.22			
CP003	1-217-658-11	JUMPER, ADJUSTABLE 0.22			
CP203	1-217-658-11	JUMPER, ADJUSTABLE 0.22			
		< DIODE >			
D001	8-719-911-19	DIODE 1SS119			
D002	8-719-911-19	DIODE 1SS119			
D201	8-719-911-19	DIODE 1SS119			
D202	8-719-911-19	DIODE 1SS119			
D402	8-719-911-19	DIODE 1SS119			
		< FILTER >			
FL001	1-235-596-11	FILTER, BAND PASS			
FL002	1-235-597-11	FILTER, BAND PASS			
FL003	1-235-607-11	FILTER, BAND PASS			
FL004	1-235-608-11	FILTER, BAND PASS			
FL101	1-235-598-21	FILTER, LOW PASS			
FL102	1-236-213-11	FILTER, LOW PASS			
FL202	1-236-214-11	FILTER, LOW PASS			
		< IC >			
IC001	8-752-009-71	IC CX20097A			
IC002	1-809-140-12	IC MODULE HGA8000			
IC003	8-752-010-40	IC CX20104			

Ref. No.	Part No.	Description			Remark
IC004	8-752-320-61	IC CXD1049P			
		< JUMPER RESISTOR >			
JR003	1-216-296-00	METAL CHIP	0	5%	1/8W
JR004	1-216-296-00	METAL CHIP	0	5%	1/8W
JR005	1-216-296-00	METAL CHIP	0	5%	1/8W
JR006	1-216-296-00	METAL CHIP	0	5%	1/8W
JR007	1-216-295-00	METAL CHIP	0	5%	1/10W
JR008	1-216-296-00	METAL CHIP	0	5%	1/8W
JR009	1-216-296-00	METAL CHIP	0	5%	1/8W
JR010	1-216-295-00	METAL CHIP	0	5%	1/10W
JR011	1-216-296-00	METAL CHIP	0	5%	1/8W
JR012	1-216-295-00	METAL CHIP	0	5%	1/10W
JR013	1-216-295-00	METAL CHIP	0	5%	1/10W
JR014	1-216-295-00	METAL CHIP	0	5%	1/10W
JR015	1-216-296-00	METAL CHIP	0	5%	1/8W
JR016	1-216-296-00	METAL CHIP	0	5%	1/8W
JR017	1-216-295-00	METAL CHIP	0	5%	1/10W
JR018	1-216-295-00	METAL CHIP	0	5%	1/10W
JR019	1-216-296-00	METAL CHIP	0	5%	1/8W
JR020	1-216-296-00	METAL CHIP	0	5%	1/8W
JR021	1-216-296-00	METAL CHIP	0	5%	1/8W
JR022	1-216-295-00	METAL CHIP	0	5%	1/10W
JR023	1-216-296-00	METAL CHIP	0	5%	1/8W
JR024	1-216-296-00	METAL CHIP	0	5%	1/8W
JR025	1-216-296-00	METAL CHIP	0	5%	1/8W
JR026	1-216-296-00	METAL CHIP	0	5%	1/8W
JR027	1-216-296-00	METAL CHIP	0	5%	1/8W
JR028	1-216-296-00	METAL CHIP	0	5%	1/8W
JR029	1-216-295-00	METAL CHIP	0	5%	1/10W
JR030	1-216-295-00	METAL CHIP	0	5%	1/10W
JR031	1-216-296-00	METAL CHIP	0	5%	1/8W
JR032	1-216-296-00	METAL CHIP	0	5%	1/8W
JR033	1-216-295-00	METAL CHIP	0	5%	1/10W
JR034	1-216-295-00	METAL CHIP	0	5%	1/10W
		< COIL >			
L501	1-414-189-31	INDUCTOR	100uH		
		< TRANSISTOR >			
Q401	8-729-216-22	TRANSISTOR	2SA1162-G		
Q402	8-729-120-28	TRANSISTOR	2SC1623-L5L6		
Q403	8-729-216-22	TRANSISTOR	2SA1162-G		
Q404	8-729-120-28	TRANSISTOR	2SC1623-L5L6		
		< RESISTOR >			
R021	1-216-061-00	METAL CHIP	3.3K	5%	1/10W
R022	1-216-077-00	METAL CHIP	15K	5%	1/10W

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Ref. No.	Part No.	Description			Remark
R023	1-216-070-00	METAL CHIP	7.5K	5%	1/10W
R024	1-216-042-00	METAL CHIP	510	5%	1/10W
R025	1-216-075-00	METAL CHIP	12K	5%	1/10W
R026	1-216-073-00	METAL CHIP	10K	5%	1/10W
R027	1-216-070-00	METAL CHIP	7.5K	5%	1/10W
R028	1-216-061-00	METAL CHIP	3.3K	5%	1/10W
R029	1-216-052-00	METAL CHIP	1.3K	5%	1/10W
R030	1-216-022-00	METAL CHIP	75	5%	1/10W
R031	1-216-076-00	METAL CHIP	13K	5%	1/10W
R032	1-216-076-00	METAL CHIP	13K	5%	1/10W
R033	1-216-051-00	METAL CHIP	1.2K	5%	1/10W
R034	1-216-056-00	METAL GLAZE	2K	5%	1/10W
R035	1-216-052-00	METAL CHIP	1.3K	5%	1/10W
R036	1-216-103-00	METAL CHIP	180K	5%	1/10W
R037	1-216-067-00	METAL CHIP	5.6K	5%	1/10W
R038	1-216-083-00	METAL CHIP	27K	5%	1/10W
R040	1-216-065-00	METAL CHIP	4.7K	5%	1/10W
R041	1-216-042-00	METAL CHIP	510	5%	1/10W
R042	1-216-043-00	METAL CHIP	560	5%	1/10W
R043	1-216-073-00	METAL CHIP	10K	5%	1/10W
R044	1-216-117-00	METAL CHIP	680K	5%	1/10W
R045	1-216-025-00	METAL CHIP	100	5%	1/10W
R046	1-216-035-00	METAL CHIP	270	5%	1/10W
R047	1-216-085-00	METAL CHIP	33K	5%	1/10W
R048	1-249-405-11	CARBON	100	5%	1/4W
R050	1-216-081-00	METAL CHIP	22K	5%	1/10W
R051	1-216-049-00	METAL CHIP	1K	5%	1/10W
R052	1-216-081-00	METAL CHIP	22K	5%	1/10W
R053	1-216-082-00	METAL GLAZE	24K	5%	1/10W
R054	1-216-073-00	METAL CHIP	10K	5%	1/10W
R055	1-216-077-00	METAL CHIP	15K	5%	1/10W
R056	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R057	1-216-080-00	METAL CHIP	20K	5%	1/10W
R059	1-216-079-00	METAL CHIP	18K	5%	1/10W
R060	1-216-077-00	METAL CHIP	15K	5%	1/10W
R061	1-216-077-00	METAL CHIP	15K	5%	1/10W
R062	1-216-077-00	METAL CHIP	15K	5%	1/10W
R063	1-216-077-00	METAL CHIP	15K	5%	1/10W
R064	1-216-035-00	METAL CHIP	270	5%	1/10W
R065	1-216-103-00	METAL CHIP	180K	5%	1/10W
R066	1-216-037-00	METAL CHIP	330	5%	1/10W
R069	1-216-070-00	METAL CHIP	7.5K	5%	1/10W
R083	1-216-067-00	METAL CHIP	5.6K	5%	1/10W
R085	1-216-067-00	METAL CHIP	5.6K	5%	1/10W
R093	1-216-049-00	METAL CHIP	1K	5%	1/10W
R094	1-216-043-00	METAL CHIP	560	5%	1/10W
R101	1-216-077-00	METAL CHIP	15K	5%	1/10W
R104	1-216-075-00	METAL CHIP	12K	5%	1/10W

Ref. No.	Part No.	Description			Remark
R105	1-216-109-00	METAL CHIP	330K	5%	1/10W
R106	1-216-109-00	METAL CHIP	330K	5%	1/10W
R107	1-216-109-00	METAL CHIP	330K	5%	1/10W
R108	1-216-109-00	METAL CHIP	330K	5%	1/10W
R109	1-216-075-00	METAL CHIP	12K	5%	1/10W
R111	1-216-077-00	METAL CHIP	15K	5%	1/10W
R112	1-216-027-00	METAL CHIP	120	5%	1/10W
R113	1-216-097-00	METAL CHIP	100K	5%	1/10W
R114	1-216-078-00	METAL GLAZE	16K	5%	1/10W
R115	1-216-078-00	METAL GLAZE	16K	5%	1/10W
R116	1-216-066-00	METAL CHIP	5.1K	5%	1/10W
R119	1-216-066-00	METAL CHIP	5.1K	5%	1/10W
R121	1-216-066-00	METAL CHIP	5.1K	5%	1/10W
R123	1-216-066-00	METAL CHIP	5.1K	5%	1/10W
R221	1-216-061-00	METAL CHIP	3.3K	5%	1/10W
R222	1-216-077-00	METAL CHIP	15K	5%	1/10W
R223	1-216-070-00	METAL CHIP	7.5K	5%	1/10W
R224	1-216-042-00	METAL CHIP	510	5%	1/10W
R225	1-216-075-00	METAL CHIP	12K	5%	1/10W
R226	1-216-073-00	METAL CHIP	10K	5%	1/10W
R227	1-216-070-00	METAL CHIP	7.5K	5%	1/10W
R228	1-216-061-00	METAL CHIP	3.3K	5%	1/10W
R229	1-216-052-00	METAL CHIP	1.3K	5%	1/10W
R230	1-216-022-00	METAL CHIP	75	5%	1/10W
R231	1-216-076-00	METAL CHIP	13K	5%	1/10W
R232	1-216-076-00	METAL CHIP	13K	5%	1/10W
R233	1-216-051-00	METAL CHIP	1.2K	5%	1/10W
R234	1-216-056-00	METAL GLAZE	2K	5%	1/10W
R235	1-216-052-00	METAL CHIP	1.3K	5%	1/10W
R236	1-216-103-00	METAL CHIP	180K	5%	1/10W
R237	1-216-067-00	METAL CHIP	5.6K	5%	1/10W
R238	1-216-083-00	METAL CHIP	27K	5%	1/10W
R241	1-216-042-00	METAL CHIP	510	5%	1/10W
R242	1-216-043-00	METAL CHIP	560	5%	1/10W
R243	1-216-073-00	METAL CHIP	10K	5%	1/10W
R244	1-216-117-00	METAL CHIP	680K	5%	1/10W
R245	1-216-025-00	METAL CHIP	100	5%	1/10W
R248	1-249-405-11	CARBON	100	5%	1/4W
R250	1-216-075-00	METAL CHIP	12K	5%	1/10W
R251	1-216-049-00	METAL CHIP	1K	5%	1/10W
R252	1-216-081-00	METAL CHIP	22K	5%	1/10W
R254	1-216-073-00	METAL CHIP	10K	5%	1/10W
R255	1-216-078-00	METAL GLAZE	16K	5%	1/10W
R264	1-216-035-00	METAL CHIP	270	5%	1/10W
R265	1-216-103-00	METAL CHIP	180K	5%	1/10W
R266	1-216-037-00	METAL CHIP	330	5%	1/10W
R269	1-216-066-00	METAL CHIP	5.1K	5%	1/10W
R283	1-216-069-00	METAL CHIP	6.8K	5%	1/10W
R293	1-216-042-00	METAL CHIP	510	5%	1/10W

Ref.No.	Part No.	Description			Remark
R294	1-216-043-00	METAL CHIP	560	5%	1/10W
R301	1-216-081-00	METAL CHIP	22K	5%	1/10W
R302	1-216-081-00	METAL CHIP	22K	5%	1/10W
R303	1-216-081-00	METAL CHIP	22K	5%	1/10W
R304	1-216-081-00	METAL CHIP	22K	5%	1/10W
R401	1-216-073-00	METAL CHIP	10K	5%	1/10W
R402	1-216-097-00	METAL CHIP	100K	5%	1/10W
R403	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R404	1-216-082-00	METAL GLAZE	24K	5%	1/10W
R405	1-216-093-00	METAL CHIP	68K	5%	1/10W
R408	1-216-081-00	METAL CHIP	22K	5%	1/10W
R409	1-216-037-00	METAL CHIP	330	5%	1/10W
R412	1-216-037-00	METAL CHIP	330	5%	1/10W
R413	1-216-093-00	METAL CHIP	68K	5%	1/10W
R414	1-216-093-00	METAL CHIP	68K	5%	1/10W
R416	1-216-113-00	METAL CHIP	470K	5%	1/10W
		< VIBRATOR >			
X001	1-579-050-11	OSCILLATOR, CRYSTAL (149.475KHz)			

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* A-6782-023-A CG-16 BOARD, COMPLETE

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(Ref.No 1,000 Series)

< CAPACITOR >

C401	1-126-163-11	ELECT	4.7uF	20%	50V
C402	1-124-589-11	ELECT	47uF	20%	16V
C403	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C404	1-124-589-11	ELECT	47uF	20%	16V
C405	1-163-227-11	CERAMIC CHIP	10PF	0.5PF	50V
C406	1-163-235-11	CERAMIC CHIP	22PF	5%	50V
C407	1-163-235-11	CERAMIC CHIP	22PF	5%	50V
C408	1-163-239-11	CERAMIC CHIP	33PF	5%	50V
C410	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C411	1-124-589-11	ELECT	47uF	20%	16V
C412	1-124-589-11	ELECT	47uF	20%	16V
C413	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C420	1-163-141-00	CERAMIC CHIP	0.001uF	5%	50V
C421	1-130-487-00	MYLAR	0.022uF	5%	50V
C422	1-163-037-11	CERAMIC CHIP	0.022uF	10%	25V
C423	1-163-139-00	CERAMIC CHIP	820PF	5%	50V
C424	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C425	1-126-301-11	ELECT	1uF	20%	50V
C426	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C427	1-124-589-11	ELECT	47uF	20%	16V
C432	1-124-589-11	ELECT	47uF	20%	16V
C440	1-124-767-00	ELECT	2.2uF	20%	50V
C441	1-130-492-11	MYLAR	0.056uF	5%	50V
C442	1-163-037-11	CERAMIC CHIP	0.022uF	10%	25V
C443	1-163-139-00	CERAMIC CHIP	820PF	5%	50V
C444	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C445	1-126-301-11	ELECT	1uF	20%	50V
C446	1-163-145-00	CERAMIC CHIP	0.0015uF	5%	50V
C447	1-163-145-00	CERAMIC CHIP	0.0015uF	5%	50V
C448	1-124-589-11	ELECT	47uF	20%	16V
C449	1-163-031-11	CERAMIC CHIP	0.01uF		50V
		< CONNECTOR >			
CN401	1-563-314-11	CONNECTOR, BOARD TO BOARD 20P			
		< DIODE >			
D440	8-719-911-19	DIODE 1SS119			
		< IC >			
IC401	8-759-089-80	IC MB90084PF-128			
IC402	8-759-164-09	IC LA7218M-DE-R			
IC440	8-759-164-09	IC LA7218M-DE-R			
		< COIL >			
L401	1-414-189-31	INDUCTOR 100uH			
L402	1-414-189-31	INDUCTOR 100uH			
L403	1-410-513-11	INDUCTOR 22uH			
L410	1-414-189-31	INDUCTOR 100uH			
L440	1-414-189-31	INDUCTOR 100uH			
		< TRANSISTOR >			
Q402	8-729-120-28	TRANSISTOR 2SC1623-L5L6			
Q403	8-729-120-28	TRANSISTOR 2SC1623-L5L6			
Q405	8-729-216-22	TRANSISTOR 2SA1162-G			
Q440	8-729-120-28	TRANSISTOR 2SC1623-L5L6			
Q441	8-729-120-28	TRANSISTOR 2SC1623-L5L6			
Q442	8-729-120-28	TRANSISTOR 2SC1623-L5L6			
		< RESISTOR >			
R401	1-216-065-00	METAL CHIP	4.7K	5%	1/10W
R402	1-216-073-00	METAL CHIP	10K	5%	1/10W
R403	1-216-041-00	METAL CHIP	470	5%	1/10W
R404	1-216-081-00	METAL CHIP	22K	5%	1/10W
R405	1-216-666-11	METAL CHIP	4.3K	0.5%	1/10W
R406	1-216-655-11	METAL CHIP	1.5K	0.5%	1/10W
R408	1-216-295-00	METAL CHIP	0	5%	1/10W
R409	1-216-295-00	METAL CHIP	0	5%	1/10W
R410	1-216-033-00	METAL CHIP	220	5%	1/10W
R411	1-216-043-00	METAL CHIP	560	5%	1/10W
R412	1-216-017-00	METAL CHIP	47	5%	1/10W

CG-16 MA-150

Ref. No.	Part No.	Description			Remark
R413	1-216-073-00	METAL CHIP	10K	5%	1/10W
R414	1-216-073-00	METAL CHIP	10K	5%	1/10W
R420	1-216-101-00	METAL CHIP	150K	5%	1/10W
R422	1-216-043-00	METAL CHIP	560	5%	1/10W
R423	1-216-063-00	METAL CHIP	3.9K	5%	1/10W
R430	1-216-295-00	METAL CHIP	0	5%	1/10W
R431	1-249-397-11	CARBON	22	5%	1/4W
R440	1-216-101-00	METAL CHIP	150K	5%	1/10W
R441	1-216-073-00	METAL CHIP	10K	5%	1/10W
R442	1-216-043-00	METAL CHIP	560	5%	1/10W
R443	1-216-063-00	METAL CHIP	3.9K	5%	1/10W
R445	1-216-073-00	METAL CHIP	10K	5%	1/10W
R446	1-216-073-00	METAL CHIP	10K	5%	1/10W
R447	1-216-074-00	METAL CHIP	11K	5%	1/10W
R448	1-216-073-00	METAL CHIP	10K	5%	1/10W
R449	1-216-073-00	METAL CHIP	10K	5%	1/10W
R450	1-216-073-00	METAL CHIP	10K	5%	1/10W

< VIBRATOR >

X401	1-577-381-11	VIBRATOR, CRYSTAL (14.32Hz)	
X420	1-577-165-11	VIBLATOR, CERAMIC (500kHz)	
X440	1-577-165-11	VIBLATOR, CERAMIC (500kHz)	

****

* A-6755-991-A MA-150 BOARD, COMPLETE

****

(Ref. No 9,000 Series)

	1-249-431-11	CARBON	15K	5%	1/4W
*	3-660-828-00	HOLDER (9), PC BOARD			
	3-682-057-21	SPACER (SMALL)			
	3-945-945-01	SUPPORT (DIA. 3), PCB			

< CAPACITOR >

C301	1-126-101-11	ELECT	100uF	20%	16V
C302	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C303	1-126-101-11	ELECT	100uF	20%	16V
C304	1-126-101-11	ELECT	100uF	20%	16V
C305	1-126-101-11	ELECT	100uF	20%	16V
C306	1-126-101-11	ELECT	100uF	20%	16V
C307	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C308	1-126-101-11	ELECT	100uF	20%	16V
C311	1-124-471-00	ELECT	1000uF	20%	6.3V
C312	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C313	1-163-099-00	CERAMIC CHIP	18PF	5%	50V
C314	1-163-099-00	CERAMIC CHIP	18PF	5%	50V
C315	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C360	1-124-925-11	ELECT	2.2uF	20%	100V
C401	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C402	1-124-472-11	ELECT	470uF	20%	10V

Ref. No.	Part No.	Description			Remark
C430	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C610	1-124-589-11	ELECT	47uF	20%	16V
C611	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C612	1-163-145-00	CERAMIC CHIP	0.0015uF	5%	50V
C613	1-124-589-11	ELECT	47uF	20%	16V
C614	1-163-024-00	CERAMIC CHIP	0.018uF	10%	50V
C615	1-126-301-11	ELECT	1uF	20%	50V
C616	1-130-019-00	FILM	0.0012uF	5%	50V
C617	1-163-121-00	CERAMIC CHIP	150PF	5%	50V
C618	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C620	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V
C621	1-164-182-11	CERAMIC CHIP	0.0033uF	10%	50V
C623	1-124-903-11	ELECT	1uF	20%	50V
C624	1-124-902-00	ELECT	0.47uF	20%	50V
C625	1-124-477-11	ELECT	47uF	20%	25V
C626	1-163-024-00	CERAMIC CHIP	0.018uF	10%	50V
C628	1-124-477-11	ELECT	47uF	20%	25V
C629	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C631	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C632	1-124-925-11	ELECT	2.2uF	20%	100V
C650	1-124-598-11	ELECT	22uF	20%	25V
C651	1-104-695-11	FILM	330PF	5%	100V
C652	1-104-696-11	FILM	0.015uF	5%	100V
C653	1-163-011-11	CERAMIC CHIP	0.0015uF	10%	50V
C654	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C670	1-126-103-11	ELECT	470uF	20%	16V
C691	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C701	1-124-907-11	ELECT	10uF	20%	50V
C702	1-124-907-11	ELECT	10uF	20%	50V
C703	1-124-261-00	ELECT	10uF	20%	50V
C704	1-124-261-00	ELECT	10uF	20%	50V
C705	1-124-261-00	ELECT	10uF	20%	50V
C710	1-124-261-00	ELECT	10uF	20%	50V
C711	1-124-261-00	ELECT	10uF	20%	50V
C712	1-124-261-00	ELECT	10uF	20%	50V
C713	1-124-589-11	ELECT	47uF	20%	16V
C714	1-124-261-00	ELECT	10uF	20%	50V
C715	1-124-126-00	ELECT	47uF	20%	10V
C716	1-124-126-00	ELECT	47uF	20%	10V
C720	1-126-177-11	ELECT	100uF	20%	10V
C721	1-124-261-00	ELECT	10uF	20%	50V
C724	1-124-907-11	ELECT	10uF	20%	50V
C727	1-124-477-11	ELECT	47uF	20%	25V
C728	1-124-589-11	ELECT	47uF	20%	16V
C729	1-126-101-11	ELECT	100uF	20%	16V
C731	1-124-604-00	ELECT	330uF	20%	10V
C732	1-124-907-11	ELECT	10uF	20%	50V
C733	1-126-176-11	ELECT	220uF	20%	10V
C734	1-124-907-11	ELECT	10uF	20%	50V

Ref. No.	Part No.	Description			Remark
C742	1-124-477-11	ELECT	47uF	20%	25V
C743	1-124-477-11	ELECT	47uF	20%	25V
C745	1-124-907-11	ELECT	10uF	20%	50V
C746	1-124-907-11	ELECT	10uF	20%	50V
C747	1-124-477-11	ELECT	47uF	20%	25V
C748	1-124-477-11	ELECT	47uF	20%	25V
C749	1-124-907-11	ELECT	10uF	20%	50V
C760	1-124-916-11	ELECT	22uF	20%	63V
C770	1-124-916-11	ELECT	22uF	20%	63V
C780	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V
C781	1-124-477-11	ELECT	47uF	20%	25V
C782	1-124-916-11	ELECT	22uF	20%	63V
C783	1-124-477-11	ELECT	47uF	20%	25V
C790	1-124-916-11	ELECT	22uF	20%	63V
C801	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C802	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C803	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C810	1-126-101-11	ELECT	100uF	20%	16V
C811	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C812	1-126-101-11	ELECT	100uF	20%	16V
C850	1-124-589-11	ELECT	47uF	20%	16V
C851	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C853	1-124-589-11	ELECT	47uF	20%	16V
C854	1-124-589-11	ELECT	47uF	20%	16V
C855	1-163-127-00	CERAMIC CHIP	270PF	5%	50V
C860	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C861	1-126-176-11	ELECT	220uF	20%	10V
C863	1-124-477-11	ELECT	47uF	20%	25V
C864	1-124-472-11	ELECT	470uF	20%	10V
C901	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C902	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C903	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C904	1-163-001-11	CERAMIC CHIP	220PF	10%	50V
C905	1-163-005-11	CERAMIC CHIP	470PF	10%	50V
C906	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C907	1-124-589-11	ELECT	47uF	20%	16V

< CONNECTOR >

CN301	1-750-198-21	CONNECTOR, BOARD TO BOARD 16P	
CN302	1-750-198-21	CONNECTOR, BOARD TO BOARD 16P	
* CN303	1-560-891-00	PIN, CONNECTOR 3P	
* CN304	1-568-790-31	PIN, CONNECTOR 13P	
CN401	1-506-468-11	PIN, CONNECTOR 3P	
* CN402	1-560-891-00	PIN, CONNECTOR 3P	
* CN403	1-560-891-00	PIN, CONNECTOR 3P	
* CN404	1-560-892-00	PIN, CONNECTOR 4P	
CN410	1-695-385-21	PIN, CONNECTOR (PC BOARD) 24P	
* CN601	1-573-844-11	CONNECTOR, BOARD TO BOARD 12P	
* CN602	1-573-844-11	CONNECTOR, BOARD TO BOARD 12P	
* CN610	1-573-837-11	CONNECTOR, BOARD TO BOARD 5P	
* CN611	1-573-843-11	CONNECTOR, BOARD TO BOARD 11P	
* CN612	1-573-839-11	CONNECTOR, BOARD TO BOARD 7P	
* CN620	1-560-891-00	PIN, CONNECTOR 3P	
* CN650	1-560-893-00	PIN, CONNECTOR 5P	
* CN651	1-560-891-00	PIN, CONNECTOR 3P	
CN801	1-569-341-11	CONNECTOR, BOARD TO BOARD 19P	
CN802	1-569-339-11	CONNECTOR, BOARD TO BOARD 7P	
* CN810	1-573-844-11	CONNECTOR, BOARD TO BOARD 12P	
CN811	1-573-846-11	CONNECTOR, BOARD TO BOARD 14P	
* CN830	1-566-154-11	CONNECTOR, BOARD TO BOARD 20P	

< JACK >

CNJ901	1-565-351-41	JACK, PIN 3P (LINE IN 1)
CNJ902	1-565-351-41	JACK, PIN 3P (LINE OUT)
CNJ903	1-507-562-00	JACK (CONTROL S IN)

< DIODE >

D301	8-719-987-87	DIODE	ERA85-009
D302	8-719-200-82	DIODE	11ES2
D303	8-719-200-82	DIODE	11ES2
D350	8-719-987-87	DIODE	ERA85-009
D360	8-719-911-19	DIODE	1SS119
D361	8-719-911-19	DIODE	1SS119
D401	8-719-987-87	DIODE	ERA85-009
D420	8-719-911-19	DIODE	1SS119
D730	8-719-911-19	DIODE	1SS119
D731	8-719-911-19	DIODE	1SS119
D732	8-719-911-19	DIODE	1SS119
D810	8-719-200-82	DIODE	11ES2
D901	8-719-109-93	DIODE	RD6.2ESB2
D902	8-719-109-93	DIODE	RD6.2ESB2
D903	8-719-109-93	DIODE	RD6.2ESB2

< MODULE IC >

HIC401	1-810-070-11	IC	CTL

< IC >

IC301	8-752-839-90	IC	CXP80624-458Q
⚠IC302	8-759-982-10	IC	RC7809FA
⚠IC303	8-759-982-10	IC	RC7809FA
IC420	8-759-970-89	IC	BA10358F
IC610	8-759-089-82	IC	BA7790LS
IC701	8-759-520-50	IC	BH7733S
IC702	8-752-017-50	IC	CX20175
IC721	8-759-100-96	IC	uPC4558G2
⚠IC810	8-759-982-10	IC	RC7809FA
IC850	8-759-511-44	IC	LVA522SA

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety. Replace only with part number specified.	Les composants identifiés par une marque ⚠ sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

MA-150

Ref. No.	Part No.	Description			Remark
		< JUMPER RESISTOR >			
JR300	1-216-296-00	METAL CHIP	0	5%	1/8W
JR301	1-216-295-00	METAL CHIP	0	5%	1/10W
JR302	1-216-295-00	METAL CHIP	0	5%	1/10W
JR303	1-216-295-00	METAL CHIP	0	5%	1/10W
JR304	1-216-295-00	METAL CHIP	0	5%	1/10W
JR305	1-216-295-00	METAL CHIP	0	5%	1/10W
JR306	1-216-295-00	METAL CHIP	0	5%	1/10W
JR307	1-216-295-00	METAL CHIP	0	5%	1/10W
JR308	1-216-295-00	METAL CHIP	0	5%	1/10W
JR309	1-216-296-00	METAL CHIP	0	5%	1/8W
JR310	1-216-295-00	METAL CHIP	0	5%	1/10W
JR311	1-216-296-00	METAL CHIP	0	5%	1/8W
		< COIL >			
L301	1-414-183-41	INDUCTOR 10uH			
L302	1-414-183-41	INDUCTOR 10uH			
L610	1-414-189-31	INDUCTOR 100uH			
L611	1-408-247-00	INDUCTOR 33mH			
L612	1-410-091-31	INDUCTOR 22mH			
L650	1-408-398-00	INDUCTOR 1.2uH			
L670	1-414-189-31	INDUCTOR 100uH			
L690	1-414-189-31	INDUCTOR 100uH			
L701	1-414-189-31	INDUCTOR 100uH			
L860	1-414-186-31	INDUCTOR 33uH			
L901	1-414-183-41	INDUCTOR 10uH			
		< TRANSISTOR >			
Q365	8-729-421-19	TRANSISTOR	UN2213		
Q366	8-729-901-06	TRANSISTOR	DTA144EK		
⚠Q420	8-729-216-22	TRANSISTOR	2SA1162-G		
⚠Q421	8-729-423-XX	TRANSISTOR	2SD2137-OP-TA		
Q610	8-729-421-19	TRANSISTOR	UN2213		
Q620	8-729-421-19	TRANSISTOR	UN2213		
Q621	8-729-421-19	TRANSISTOR	UN2213		
Q622	8-729-421-19	TRANSISTOR	UN2213		
Q623	8-729-424-08	TRANSISTOR	UN2111		
Q624	8-729-421-19	TRANSISTOR	UN2213		
⚠Q650	8-729-140-96	TRANSISTOR	2SD774-34		
Q750	8-729-303-37	TRANSISTOR	2SD655-E		
Q751	8-729-120-28	TRANSISTOR	2SC1623-L5L6		
Q752	8-729-303-37	TRANSISTOR	2SD655-E		
Q753	8-729-120-28	TRANSISTOR	2SC1623-L5L6		
Q861	8-729-119-76	TRANSISTOR	2SA1175-HFE		
		< RESISTOR >			
R310	1-249-417-11	CARBON	1K	5%	1/4W F

Ref. No.	Part No.	Description			Remark
R311	1-216-065-00	METAL CHIP	4.7K	5%	1/10W
R312	1-216-065-00	METAL CHIP	4.7K	5%	1/10W
R313	1-216-065-00	METAL CHIP	4.7K	5%	1/10W
R314	1-216-065-00	METAL CHIP	4.7K	5%	1/10W
R315	1-216-073-00	METAL CHIP	10K	5%	1/10W
R316	1-216-049-00	METAL CHIP	1K	5%	1/10W
R317	1-216-049-00	METAL CHIP	1K	5%	1/10W
R318	1-249-429-11	CARBON	10K	5%	1/4W
R319	1-249-429-11	CARBON	10K	5%	1/4W
R320	1-216-073-00	METAL CHIP	10K	5%	1/10W
R321	1-216-073-00	METAL CHIP	10K	5%	1/10W
R324	1-249-429-11	CARBON	10K	5%	1/4W
R326	1-249-429-11	CARBON	10K	5%	1/4W
R364	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R400	1-216-295-00	METAL CHIP	0	5%	1/10W
R420	1-216-097-00	METAL CHIP	100K	5%	1/10W
R421	1-216-065-00	METAL CHIP	4.7K	5%	1/10W
R422	1-216-073-00	METAL CHIP	10K	5%	1/10W
⚠R423	1-216-375-00	METAL OXIDE	3.3	5%	2W F
R424	1-216-079-00	METAL CHIP	18K	5%	1/10W
R425	1-216-097-00	METAL CHIP	100K	5%	1/10W
R430	1-216-689-11	METAL CHIP	39K	0.5%	1/10W
R431	1-216-085-00	METAL CHIP	33K	5%	1/10W
R432	1-249-405-11	CARBON	100	5%	1/4W
R433	1-249-432-11	CARBON	18K	5%	1/4W
R434	1-249-427-11	CARBON	6.8K	5%	1/4W
R435	1-249-424-11	CARBON	3.9K	5%	1/4W
R436	1-216-072-00	METAL CHIP	9.1K	5%	1/10W
R437	1-249-429-11	CARBON	10K	5%	1/4W
R611	1-216-067-00	METAL CHIP	5.6K	5%	1/10W
R612	1-216-089-00	METAL CHIP	47K	5%	1/10W
R613	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R614	1-216-077-00	METAL CHIP	15K	5%	1/10W
R615	1-216-041-00	METAL CHIP	470	5%	1/10W
R616	1-216-073-00	METAL CHIP	10K	5%	1/10W
R617	1-216-055-00	METAL CHIP	1.8K	5%	1/10W
R620	1-216-089-00	METAL CHIP	47K	5%	1/10W
R621	1-216-019-00	METAL CHIP	56	5%	1/10W
R622	1-216-031-00	METAL CHIP	180	5%	1/10W
R623	1-216-097-00	METAL CHIP	100K	5%	1/10W
R624	1-216-063-00	METAL CHIP	3.9K	5%	1/10W
R625	1-216-295-00	METAL CHIP	0	5%	1/10W
R626	1-216-029-00	METAL CHIP	150	5%	1/10W
R627	1-216-073-00	METAL CHIP	10K	5%	1/10W
R628	1-216-067-00	METAL CHIP	5.6K	5%	1/10W
R629	1-249-432-11	CARBON	18K	5%	1/4W
R630	1-216-001-00	METAL CHIP	10	5%	1/10W
R631	1-216-073-00	METAL CHIP	10K	5%	1/10W
R632	1-216-081-00	METAL CHIP	22K	5%	1/10W

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Ref. No.	Part No.	Description			Remark
R633	1-216-083-00	METAL CHIP	27K	5%	1/10W
⚠R650	1-260-081-11	CARBON	33	5%	1/2W
R651	1-216-073-00	METAL CHIP	10K	5%	1/10W
R653	1-216-081-00	METAL CHIP	22K	5%	1/10W
⚠R654	1-249-387-11	CARBON	3.3	5%	1/4W F
R701	1-216-689-11	METAL CHIP	39K	0.5%	1/10W
R702	1-249-436-11	CARBON	39K	5%	1/4W
R703	1-249-436-11	CARBON	39K	5%	1/4W
R704	1-249-436-11	CARBON	39K	5%	1/4W
R710	1-216-081-00	METAL CHIP	22K	5%	1/10W
R711	1-216-081-00	METAL CHIP	22K	5%	1/10W
R712	1-216-049-00	METAL CHIP	1K	5%	1/10W
R713	1-216-061-00	METAL CHIP	3.3K	5%	1/10W
R714	1-216-049-00	METAL CHIP	1K	5%	1/10W
R715	1-216-061-00	METAL CHIP	3.3K	5%	1/10W
R721	1-216-073-00	METAL CHIP	10K	5%	1/10W
R722	1-247-862-11	CARBON	20K	5%	1/4W
R723	1-216-073-00	METAL CHIP	10K	5%	1/10W
R724	1-249-429-11	CARBON	10K	5%	1/4W
R725	1-216-080-00	METAL CHIP	20K	5%	1/10W
R726	1-216-073-00	METAL CHIP	10K	5%	1/10W
R727	1-249-425-11	CARBON	4.7K	5%	1/4W
R728	1-216-067-00	METAL CHIP	5.6K	5%	1/10W
R730	1-249-429-11	CARBON	10K	5%	1/4W
R731	1-216-085-00	METAL CHIP	33K	5%	1/10W
R732	1-216-073-00	METAL CHIP	10K	5%	1/10W
R733	1-216-083-00	METAL CHIP	27K	5%	1/10W
R734	1-216-093-00	METAL CHIP	68K	5%	1/10W
R735	1-216-073-00	METAL CHIP	10K	5%	1/10W
R740	1-216-043-00	METAL CHIP	560	5%	1/10W
R741	1-216-043-00	METAL CHIP	560	5%	1/10W
R750	1-216-055-00	METAL CHIP	1.8K	5%	1/10W
R751	1-216-049-00	METAL CHIP	1K	5%	1/10W
R752	1-216-085-00	METAL CHIP	33K	5%	1/10W
R753	1-216-097-00	METAL CHIP	100K	5%	1/10W
R754	1-216-097-00	METAL CHIP	100K	5%	1/10W
R755	1-216-049-00	METAL CHIP	1K	5%	1/10W
R756	1-216-089-00	METAL CHIP	47K	5%	1/10W
R760	1-249-420-11	CARBON	1.8K	5%	1/4W
R761	1-216-049-00	METAL CHIP	1K	5%	1/10W
R762	1-216-085-00	METAL CHIP	33K	5%	1/10W
R763	1-216-097-00	METAL CHIP	100K	5%	1/10W
R764	1-216-097-00	METAL CHIP	100K	5%	1/10W
R765	1-216-049-00	METAL CHIP	1K	5%	1/10W
R766	1-216-089-00	METAL CHIP	47K	5%	1/10W
R770	1-216-049-00	METAL CHIP	1K	5%	1/10W
R771	1-249-417-11	CARBON	1K	5%	1/4W
R850	1-249-401-11	CARBON	47	5%	1/4W
R863	1-216-025-00	METAL CHIP	100	5%	1/10W

Ref. No.	Part No.	Description			Remark
R864	1-249-406-11	CARBON	120	5%	1/4W
R865	1-249-405-11	CARBON	100	5%	1/4W
R866	1-216-020-00	METAL GLAZE	62	5%	1/10W
R901	1-216-022-00	METAL CHIP	75	5%	1/10W
R904	1-216-043-00	METAL CHIP	560	5%	1/10W
R905	1-216-043-00	METAL CHIP	560	5%	1/10W
R906	1-249-417-11	CARBON	1K	5%	1/4W F
		< RF MODULATOR >			
⚠RF901	1-466-150-11	MODULATOR, RF (RFU-1025)			
		< VARIABLE RESISTOR >			
RV310	1-238-019-11	RES, ADJ, CARBON 47K			
RV311	1-238-019-11	RES, ADJ, CARBON 47K			
RV650	1-238-019-11	RES, ADJ, CARBON 47K			
		< TRANSFORMER >			
T650	1-423-414-11	TRANSFORMER, BIAS OSCILLATION			
		< VIBRATOR >			
X301	1-578-774-11	VIBRATOR, CRYSTAL (12MHz)			
**********					
*	A-6721-537-A	MF-176 BOARD, COMPLETE (US)			
*	A-6721-538-A	MF-176 BOARD, COMPLETE (Canadian)			
		**********			
		(Ref. No 3,000 Series)			
*	3-946-633-11	HOLDER, FL			
		< BUZZER >			
BZ101	1-529-080-11	BUZZER, PIEZOELECTRIC			
		< CAPACITOR >			
C101	1-163-235-11	CERAMIC CHIP	22PF	5%	50V
C102	1-164-505-11	CERAMIC CHIP	2.2uF		16V
C103	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C104	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C105	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C106	1-124-442-00	ELECT	330uF	20%	6.3V
C120	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C121	1-124-261-00	ELECT	10uF	20%	50V
C130	1-164-505-11	CERAMIC CHIP	2.2uF		16V
C131	1-124-635-00	ELECT	220uF	20%	6.3V
C132	1-125-486-11	DOUBLE LAYERS	0.22F		5.5V
C133	1-164-505-11	CERAMIC CHIP	2.2uF		16V
C134	1-124-635-00	ELECT	220uF	20%	6.3V
C135	1-164-505-11	CERAMIC CHIP	2.2uF		16V

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety. Replace only with part number specified.

Les composants identifiés par une marque ⚠ sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

MF-176

Ref. No.	Part No.	Description	Remark
C150	1-163-031-11	CERAMIC CHIP 0.01uF	50V
		< CONNECTOR >	
CN101	1-750-189-21	CONNECTOR, BOARD TO BOARD 16P	
CN102	1-750-189-21	CONNECTOR, BOARD TO BOARD 16P	
CN103	1-573-734-11	PIN, CONNECTOR 7P	
CN104	1-568-668-11	CONNECTOR, BOARD TO BOARD 6P	
* CN105	1-560-667-00	PIN, CONNECTOR 11P	
		< TRIMMER >	
CT101	1-141-227-00	CAP, TRIMMER 20PF	
		< DIODE >	
D120	8-719-110-08	DIODE RD8.2ESB2	
D130	8-719-987-87	DIODE ERA85-009	
D131	8-719-987-87	DIODE ERA85-009	
D132	8-719-109-97	DIODE RD6.8ESB2	
D140	8-719-955-04	LED PY5504S-1 (Super Beta)	
D141	8-719-955-04	LED PY5504S-1 (Super Beta)	
D142	8-719-955-04	LED PY5504S-1 (Bata Hi-Fi)	
D143	8-719-955-04	LED PY5504S-1 (Bata Hi-Fi)	
D144	8-719-802-02	LED TLY113AP (SAP)	
D145	8-719-940-99	LED SLR-34VC3 (STEREO)	
		< FLUORESCENT INDICATOR TUBE >	
FL101	1-517-137-21	INDICATOR TUBE, FLUORESCENT	
		< IC >	
IC101	8-759-092-99	IC MB89096-SLX2001	
IC102	8-759-501-99	IC ST93C46AB1	
IC123	8-759-520-98	IC PST572K	
IC124	8-759-510-43	IC PST572C	
		< COIL >	
L101	1-408-405-00	INDUCTOR 4.7uH	
L102	1-408-405-00	INDUCTOR 4.7uH	
L150	1-410-320-21	INDUCTOR 2.2uH	
		< TRANSISTOR >	
Q140	8-729-421-19	TRANSISTOR UN2213	
Q141	8-729-421-19	TRANSISTOR UN2213	
Q142	8-729-421-19	TRANSISTOR UN2213	
Q143	8-729-421-19	TRANSISTOR UN2213	
		< RESISTOR >	
R101	1-249-429-11	CARBON 10K 5% 1/4W	
R102	1-249-429-11	CARBON 10K 5% 1/4W	
R103	1-249-417-11	CARBON 1K 5% 1/4W	
R104	1-249-417-11	CARBON 1K 5% 1/4W	

Ref. No.	Part No.	Description	Remark
R105	1-216-049-00	METAL CHIP 1K 5% 1/10W	
R106	1-216-049-00	METAL CHIP 1K 5% 1/10W	
R107	1-216-049-00	METAL CHIP 1K 5% 1/10W	
R108	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R109	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R110	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R111	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R112	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R113	1-216-057-00	METAL CHIP 2.2K 5% 1/10W	
R114	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R116	1-216-073-00	METAL CHIP 10K 5% 1/10W	(Canadian)
R117	1-249-429-11	CARBON 10K 5% 1/4W	(US)
R118	1-249-425-11	CARBON 4.7K 5% 1/4W	
R120	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R121	1-216-061-00	METAL CHIP 3.3K 5% 1/10W	
R123	1-216-081-00	METAL CHIP 22K 5% 1/10W	
R130	1-216-113-00	METAL CHIP 470K 5% 1/10W	
R131	1-249-437-11	CARBON 47K 5% 1/4W	
R132	1-216-095-00	METAL CHIP 82K 5% 1/10W	
R133	1-249-417-11	CARBON 1K 5% 1/4W	
R140	1-216-017-00	METAL CHIP 47 5% 1/10W	
R141	1-216-017-00	METAL CHIP 47 5% 1/10W	
R142	1-216-033-00	METAL CHIP 220 5% 1/10W	
R143	1-216-041-00	METAL CHIP 470 5% 1/10W	
R150	1-216-049-00	METAL CHIP 1K 5% 1/10W	
R151	1-216-049-00	METAL CHIP 1K 5% 1/10W	
R152	1-216-049-00	METAL CHIP 1K 5% 1/10W	
R153	1-216-025-00	METAL CHIP 100 5% 1/10W	
R154	1-216-033-00	METAL CHIP 220 5% 1/10W	
R155	1-216-049-00	METAL CHIP 1K 5% 1/10W	
R156	1-216-049-00	METAL CHIP 1K 5% 1/10W	
R159	1-249-401-11	CARBON 47 5% 1/4W	
R160	1-216-037-00	METAL CHIP 330 5% 1/10W	
R161	1-216-037-00	METAL CHIP 330 5% 1/10W	
R162	1-216-025-00	METAL CHIP 100 5% 1/10W	
R163	1-216-025-00	METAL CHIP 100 5% 1/10W	
R164	1-216-037-00	METAL CHIP 330 5% 1/10W	
R165	1-216-037-00	METAL CHIP 330 5% 1/10W	
R167	1-216-025-00	METAL CHIP 100 5% 1/10W	
R168	1-216-037-00	METAL CHIP 330 5% 1/10W	
R169	1-216-049-00	METAL CHIP 1K 5% 1/10W	
R170	1-216-033-00	METAL CHIP 220 5% 1/10W	
		< VIBRATOR >	
X101	1-579-175-11	VIBRATOR, CERAMIC (10MHz)	
X102	1-567-098-00	OSCILLATOR, CRYSTAL (32kHz)	

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Ref.No.	Part No.	Description			Remark
*	A-6755-879-A	MF-177 BOARD, COMPLETE			
		**********			
		(Ref.No 1,000 Series)			
		< CAPACITOR >			
C301	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C302	1-124-589-11	ELECT	47uF	20%	16V
		< CONNECTOR >			
CN301	1-568-662-11	CONNECTOR, BOARD TO BOARD 6P			
		< DIODE >			
D301	8-719-940-82	LED SLR-34MC3 (POWER)			
D302	8-719-940-82	LED SLR-34MC3 (POWER)			
		< IC >			
IC301	1-466-833-11	IC RAY-CATCHER BLOCK (REMOTE COMMANDER)			
		< RESISTOR >			
R301	1-216-061-00	METAL CHIP	3.3K	5%	1/10W
R302	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R303	1-249-421-11	CARBON	2.2K	5%	1/4W
R304	1-216-061-00	METAL CHIP	3.3K	5%	1/10W
R305	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R306	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R307	1-216-017-00	METAL CHIP	47	5%	1/10W
R308	1-249-437-11	CARBON	47K	5%	1/4W
		< SWITCH >			
S301	1-571-977-11	SWITCH, TACTIL (⏸ PAUSE)			
S302	1-571-977-11	SWITCH, TACTIL (⏩ FF)			
S303	1-571-977-11	SWITCH, TACTIL (⏪ REW)			
S304	1-571-977-11	SWITCH, TACTIL (POWER ON/OFF)			
S305	1-571-977-11	SWITCH, TACTIL (● REC)			
S306	1-571-977-11	SWITCH, TACTIL (▷ PLAY)			
S307	1-571-977-11	SWITCH, TACTIL (■ STOP)			
S308	1-571-977-11	SWITCH, TACTIL (⏏ EJECT)			
**********					
*	A-6755-878-A	MF-178 BOARD, COMPLETE			
		**********			
		(Ref.No 1,000 Series)			
		< CAPACITOR >			
C203	1-161-494-00	CERAMIC	0.022uF		25V
		< CONNECTOR >			
* CN201	1-563-381-11	SOCKET, CONNECTOR 11P			
		< JACK >			
CNJ201	1-695-865-11	JACK, PIN 3P (LINE IN 2)			
		< DIODE >			
D201	8-719-109-97	DIODE RD6.8ESB2			
D202	8-719-109-97	DIODE RD6.8ESB2			
		< JUMPER RESISTOR >			
JR301	1-216-295-00	METAL CHIP	0	5%	1/10W
		< RESISTOR >			
R201	1-216-035-00	METAL CHIP	270	5%	1/10W
R202	1-216-035-00	METAL CHIP	270	5%	1/10W
R206	1-216-021-00	METAL CHIP	68	5%	1/10W
R207	1-216-081-00	METAL CHIP	22K	5%	1/10W
R208	1-216-073-00	METAL CHIP	10K	5%	1/10W
R209	1-216-065-00	METAL CHIP	4.7K	5%	1/10W
R210	1-216-061-00	METAL CHIP	3.3K	5%	1/10W
R211	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R212	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R214	1-216-073-00	METAL CHIP	10K	5%	1/10W
R215	1-216-065-00	METAL CHIP	4.7K	5%	1/10W
R216	1-216-061-00	METAL CHIP	3.3K	5%	1/10W
R217	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R218	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R219	1-216-049-00	METAL CHIP	1K	5%	1/10W
		< VARIABLE RESISTOR >			
RV201	1-230-819-11	RES, VAR, CARBON 2K (SHARPNESS)			
		< SWITCH >			
S201	1-572-907-11	SWITCH, SLIDE (TAPE SELECT)			
S202	1-572-907-11	SWITCH, SLIDE (COMMAND MODE)			
S203	1-571-977-11	SWITCH, TACTIL (CHANNEL -)			
S204	1-571-977-11	SWITCH, TACTIL (CHANNEL +)			
S205	1-571-977-11	SWITCH, TACTIL (TV/VTR)			
S206	1-571-977-11	SWITCH, TACTIL (INPUT SELECT)			
S207	1-571-977-11	SWITCH, TACTIL (Super Beta)			
S208	1-571-977-11	SWITCH, TACTIL (EDIT)			
S209	1-571-977-11	SWITCH, TACTIL (TAPE SPEED)			
S210	1-571-977-11	SWITCH, TACTIL (QUICK TIMER)			
S211	1-571-977-11	SWITCH, TACTIL (TIMER REC)			
S212	1-571-977-11	SWITCH, TACTIL (CL)			
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MT-45 RD-40 REEL MOTOR RP-148

Ref. No.	Part No.	Description			Remark
*	A-6755-990-A	MT-45 BOARD, COMPLETE			
		**********			
		(Ref. No 1,000 Series)			
		< CAPACITOR >			
C601	1-164-004-11	CERAMIC CHIP	0.1uF	10% 25V	
		< CONNECTOR >			
CN601	1-506-469-11	PIN, CONNECTOR 4P			
**********					
*	1-636-415-11	RD-40 BOARD			
		**********			
		(Ref. No 1,000 Series)			
	3-701-436-21	WASHER, POLYEHTHYLENE			
		< HOLE ELEMENT >			
* HD01	3-696-635-01	HOLDER, RS			
* HD02	3-696-635-01	HOLDER, RS			
		< PHOTO INTERRUPTER >			
PHD01	8-719-939-11	DIODE	GP2S09-B		
PHD02	8-719-939-11	DIODE	GP2S09-B		
**********					
	A-4910-063-B	REEL MOTOR BOARD, COMPLETE			
		**********			
		(Ref. No 4,000 Series)			
*	1-560-460-00	PIN, CONNECTOR 4P			
*	1-560-461-00	PIN, CONNECTOR 5P			
		< CAPACITOR >			
C1	1-124-589-11	ELECT	47uF	20% 16V	
C2	1-124-589-11	ELECT	47uF	20% 16V	
C3	1-124-589-11	ELECT	47uF	20% 16V	
C4	1-124-589-11	ELECT	47uF	20% 16V	
		< HOLE ELEMENT >			
H1	8-719-820-79	DIODE THS114-1			
H2	8-719-820-79	DIODE THS114-1			
		< IC >			
IC1	8-759-801-97	IC LB1615			
		< RESISTOR >			
R1	1-249-413-11	CARBON	470	5% 1/4W	
R2	1-249-429-11	CARBON	10K	5% 1/4W	
R3	1-249-437-11	CARBON	47K	5% 1/4W	
R4	1-249-437-11	CARBON	47K	5% 1/4W	
R5	1-249-437-11	CARBON	47K	5% 1/4W	
R6	1-249-437-11	CARBON	47K	5% 1/4W	
**********					
*	A-6727-491-A	RP-148 BOARD, COMPLETE			
		**********			
		(Ref. No 5,000 Series)			
		< CAPACITOR >			
C101	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C102	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C103	1-124-589-11	ELECT	47uF	20%	16V
C104	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C105	1-126-160-11	ELECT	1uF	20%	50V
C106	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C107	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C108	1-126-160-11	ELECT	1uF	20%	50V
C109	1-124-464-11	ELECT	0.22uF	20%	50V
C110	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C111	1-124-464-11	ELECT	0.22uF	20%	50V
C112	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C114	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C115	1-124-589-11	ELECT	47uF	20%	16V
C116	1-162-306-11	CERAMIC	0.01uF	20%	16V
C117	1-162-306-11	CERAMIC	0.01uF	20%	16V
C118	1-162-306-11	CERAMIC	0.01uF	20%	16V
C119	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C120	1-126-160-11	ELECT	1uF	20%	50V
C121	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C122	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C123	1-124-589-11	ELECT	47uF	20%	16V
C124	1-163-093-00	CERAMIC CHIP	10PF	5%	50V
C125	1-163-093-00	CERAMIC CHIP	10PF	5%	50V
C130	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V
C131	1-163-117-00	CERAMIC CHIP	100PF	5%	50V
C132	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V
C133	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C134	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C135	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C136	1-126-157-11	ELECT	10uF	20%	16V
C150	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V
C151	1-163-090-00	CERAMIC CHIP	7PF		50V
C152	1-163-103-00	CERAMIC CHIP	27PF	5%	50V
C153	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C154	1-124-589-11	ELECT	47uF	20%	16V
C155	1-163-115-00	CERAMIC CHIP	82PF	5%	50V
C156	1-163-126-00	CERAMIC CHIP	240PF	5%	50V
C157	1-163-112-00	CERAMIC CHIP	62PF	5%	50V

Ref. No.	Part No.	Description			Remark
C158	1-163-124-00	CERAMIC CHIP	200PF	5%	50V
C159	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V
C165	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C166	1-163-103-00	CERAMIC CHIP	27PF	5%	50V
C167	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C168	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C170	1-163-129-00	CERAMIC CHIP	330PF	5%	50V
C171	1-163-124-00	CERAMIC CHIP	200PF	5%	50V
C172	1-163-134-00	CERAMIC CHIP	510PF	5%	50V
C173	1-163-117-00	CERAMIC CHIP	100PF	5%	50V
C174	1-163-117-00	CERAMIC CHIP	100PF	5%	50V
C175	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C176	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V
C177	1-163-117-00	CERAMIC CHIP	100PF	5%	50V
C178	1-163-093-00	CERAMIC CHIP	10PF	5%	50V
C179	1-163-106-00	CERAMIC CHIP	36PF	5%	50V
C180	1-163-097-00	CERAMIC CHIP	15PF	5%	50V
C181	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V
C182	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C183	1-124-126-00	ELECT	47uF	20%	10V
C190	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C191	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C192	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C193	1-163-129-00	CERAMIC CHIP	330PF	5%	50V
C194	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C195	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C196	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C197	1-163-105-00	CERAMIC CHIP	33PF	5%	50V
C198	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C199	1-163-111-00	CERAMIC CHIP	56PF	5%	50V
C200	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C201	1-124-589-11	ELECT	47uF	20%	16V
C210	1-162-294-31	CERAMIC	0.001uF	10%	50V
C211	1-163-109-00	CERAMIC CHIP	47PF	5%	50V
C212	1-163-129-00	CERAMIC CHIP	330PF	5%	50V
C213	1-163-109-00	CERAMIC CHIP	47PF	5%	50V
C214	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C215	1-124-126-00	ELECT	47uF	20%	10V

< CONNECTOR >

CN101	1-569-336-11	CONNECTOR, BOARD TO BOARD 7P	
* CN102	1-564-031-00	PIN, CONNECTOR 6P	
CN103	1-569-338-11	CONNECTOR, BOARD TO BOARD 19P	
* CN104	1-564-029-00	PIN, CONNECTOR 4P	
* CN105	1-564-028-00	PIN, CONNECTOR 3P	

< DIODE >

D101	8-719-800-76	DIODE	1SS226
D103	8-719-800-76	DIODE	1SS226

< IC >

IC101	8-759-066-06	IC	uPC2343CT

< JUMPER RESISTOR >

JR001	1-216-296-00	METAL CHIP	0	5%	1/8W
JR002	1-216-296-00	METAL CHIP	0	5%	1/8W
JR005	1-216-295-00	METAL CHIP	0	5%	1/10W
JR006	1-216-296-00	METAL CHIP	0	5%	1/8W
JR007	1-216-296-00	METAL CHIP	0	5%	1/8W

< COIL >

L101	1-414-189-31	INDUCTOR	100uH
L102	1-408-405-00	INDUCTOR	4.7uH
L103	1-408-405-00	INDUCTOR	4.7uH
L104	1-414-185-41	INDUCTOR	22uH
L105	1-414-189-31	INDUCTOR	100uH
L110	1-410-507-11	INDUCTOR	6.8uH
L111	1-410-521-11	INDUCTOR	100uH
L120	1-410-513-11	INDUCTOR	22uH
L121	1-410-509-11	INDUCTOR	10uH
L122	1-410-522-11	INDUCTOR	120uH
L123	1-410-515-11	INDUCTOR	33uH
L124	1-410-525-11	INDUCTOR	220uH
L125	1-408-426-00	INDUCTOR	270uH
L126	1-410-521-11	INDUCTOR	100uH
L130	1-410-521-11	INDUCTOR	100uH
L131	1-410-506-11	INDUCTOR	5.6uH
L132	1-410-501-11	INDUCTOR	2.2uH
L133	1-410-512-11	INDUCTOR	18uH
L134	1-408-429-00	INDUCTOR	470uH
L135	1-410-508-11	INDUCTOR	8.2uH
L136	1-410-514-11	INDUCTOR	27uH
L140	1-410-516-11	INDUCTOR	39uH
L141	1-410-507-11	INDUCTOR	6.8uH
L142	1-410-521-11	INDUCTOR	100uH
L145	1-410-521-11	INDUCTOR	100uH

< TRANSISTOR >

Q101	8-729-207-65	TRANSISTOR	RN1410
Q102	8-729-207-65	TRANSISTOR	RN1410
Q103	8-729-424-12	TRANSISTOR	UN2112
Q104	8-729-421-19	TRANSISTOR	UN2213
Q105	8-729-120-28	TRANSISTOR	2SC1623-L5L6
Q106	8-729-120-28	TRANSISTOR	2SC1623-L5L6
Q107	8-729-120-28	TRANSISTOR	2SC1623-L5L6
Q108	8-729-120-28	TRANSISTOR	2SC1623-L5L6
Q120	8-729-216-22	TRANSISTOR	2SA1162-G

RP-148

Ref. No.	Part No.	Description		Remark
Q121	8-729-421-22	TRANSISTOR	UN2211	
Q122	8-729-120-28	TRANSISTOR	2SC1623-L5L6	
Q124	8-729-120-28	TRANSISTOR	2SC1623-L5L6	
Q125	8-729-120-28	TRANSISTOR	2SC1623-L5L6	
Q126	8-729-421-19	TRANSISTOR	UN2213	
Q130	8-729-216-22	TRANSISTOR	2SA1162-G	
Q131	8-729-120-28	TRANSISTOR	2SC1623-L5L6	
Q132	8-729-120-28	TRANSISTOR	2SC1623-L5L6	
Q135	8-729-120-28	TRANSISTOR	2SC1623-L5L6	
Q136	8-729-424-59	TRANSISTOR	UN2212	
Q137	8-729-120-28	TRANSISTOR	2SC1623-L5L6	
Q138	8-729-120-28	TRANSISTOR	2SC1623-L5L6	
Q139	8-729-120-28	TRANSISTOR	2SC1623-L5L6	
Q140	8-729-120-28	TRANSISTOR	2SC1623-L5L6	
Q145	8-729-120-28	TRANSISTOR	2SC1623-L5L6	
Q146	8-729-424-32	TRANSISTOR	UN2117	
Q147	8-729-424-32	TRANSISTOR	UN2117	
Q148	8-729-120-28	TRANSISTOR	2SC1623-L5L6	
Q149	8-729-120-28	TRANSISTOR	2SC1623-L5L6	
Q150	8-729-120-28	TRANSISTOR	2SC1623-L5L6	
Q151	8-729-120-28	TRANSISTOR	2SC1623-L5L6	
Q152	8-729-207-65	TRANSISTOR	RN1410	
Q153	8-729-424-59	TRANSISTOR	UN2212	
Q155	8-729-120-28	TRANSISTOR	2SC1623-L5L6	
Q156	8-729-216-22	TRANSISTOR	2SA1162-G	
Q157	8-729-120-28	TRANSISTOR	2SC1623-L5L6	
Q158	8-729-216-22	TRANSISTOR	2SA1162-G	
Q159	8-729-120-28	TRANSISTOR	2SC1623-L5L6	
Q160	8-729-120-28	TRANSISTOR	2SC1623-L5L6	

< RESISTOR >

R101	1-216-019-00	METAL CHIP	56	5%	1/10W
R102	1-216-019-00	METAL CHIP	56	5%	1/10W
R103	1-216-051-00	METAL CHIP	1.2K	5%	1/10W
R104	1-216-041-00	METAL CHIP	470	5%	1/10W
R105	1-216-051-00	METAL CHIP	1.2K	5%	1/10W
R106	1-216-041-00	METAL CHIP	470	5%	1/10W
R107	1-216-077-00	METAL CHIP	15K	5%	1/10W
R108	1-216-037-00	METAL CHIP	330	5%	1/10W
R109	1-216-037-00	METAL CHIP	330	5%	1/10W
R110	1-216-077-00	METAL CHIP	15K	5%	1/10W
R111	1-216-065-00	METAL CHIP	4.7K	5%	1/10W
R119	1-216-029-00	METAL CHIP	150	5%	1/10W
R120	1-216-689-11	METAL CHIP	39K	0.5%	1/10W
R121	1-216-075-00	METAL CHIP	12K	5%	1/10W
R122	1-216-049-00	METAL CHIP	1K	5%	1/10W
R123	1-216-037-00	METAL CHIP	330	5%	1/10W
R124	1-216-037-00	METAL CHIP	330	5%	1/10W
R125	1-216-053-00	METAL CHIP	1.5K	5%	1/10W
R126	1-216-071-00	METAL CHIP	8.2K	5%	1/10W
R127	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R128	1-216-041-00	METAL CHIP	470	5%	1/10W
R129	1-216-019-00	METAL CHIP	56	5%	1/10W
R130	1-216-089-00	METAL CHIP	47K	5%	1/10W
R131	1-216-069-00	METAL CHIP	6.8K	5%	1/10W
R132	1-216-085-00	METAL CHIP	33K	5%	1/10W
R133	1-249-429-11	CARBON	10K	5%	1/4W
R150	1-216-069-00	METAL CHIP	6.8K	5%	1/10W
R151	1-216-085-00	METAL CHIP	33K	5%	1/10W
R152	1-216-033-00	METAL CHIP	220	5%	1/10W
R153	1-216-045-00	METAL CHIP	680	5%	1/10W
R154	1-216-049-00	METAL CHIP	1K	5%	1/10W
R155	1-216-041-00	METAL CHIP	470	5%	1/10W
R156	1-216-027-00	METAL CHIP	120	5%	1/10W
R157	1-216-073-00	METAL CHIP	10K	5%	1/10W
R158	1-216-017-00	METAL CHIP	47	5%	1/10W
R159	1-216-081-00	METAL CHIP	22K	5%	1/10W
R160	1-216-049-00	METAL CHIP	1K	5%	1/10W
R161	1-216-077-00	METAL CHIP	15K	5%	1/10W
R162	1-216-081-00	METAL CHIP	22K	5%	1/10W
R163	1-216-081-00	METAL CHIP	22K	5%	1/10W
R164	1-249-405-11	CARBON	100	5%	1/4W
R165	1-216-053-00	METAL CHIP	1.5K	5%	1/10W
R166	1-216-085-00	METAL CHIP	33K	5%	1/10W
R167	1-216-077-00	METAL CHIP	15K	5%	1/10W
R168	1-216-039-00	METAL CHIP	390	5%	1/10W
R169	1-216-029-00	METAL CHIP	150	5%	1/10W
R170	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R171	1-216-021-00	METAL CHIP	68	5%	1/10W
R174	1-249-413-11	CARBON	470	5%	1/4W
R175	1-216-029-00	METAL CHIP	150	5%	1/10W
R176	1-216-037-00	METAL CHIP	330	5%	1/10W
R177	1-216-017-00	METAL CHIP	47	5%	1/10W
R178	1-216-037-00	METAL CHIP	330	5%	1/10W
R179	1-216-089-00	METAL CHIP	47K	5%	1/10W
R180	1-216-073-00	METAL CHIP	10K	5%	1/10W
R181	1-216-025-00	METAL CHIP	100	5%	1/10W
R182	1-216-041-00	METAL CHIP	470	5%	1/10W
R183	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R184	1-216-049-00	METAL CHIP	1K	5%	1/10W
R185	1-216-073-00	METAL CHIP	10K	5%	1/10W
R186	1-216-049-00	METAL CHIP	1K	5%	1/10W
R187	1-216-041-00	METAL CHIP	470	5%	1/10W
R189	1-216-025-00	METAL CHIP	100	5%	1/10W
R190	1-216-041-00	METAL CHIP	470	5%	1/10W
R191	1-216-041-00	METAL CHIP	470	5%	1/10W

Ref. No.	Part No.	Description			Remark
R192	1-216-051-00	METAL CHIP	1.2K	5%	1/10W
R193	1-216-041-00	METAL CHIP	470	5%	1/10W
R194	1-216-083-00	METAL CHIP	27K	5%	1/10W
R195	1-216-077-00	METAL CHIP	15K	5%	1/10W
R200	1-249-423-11	CARBON	3.3K	5%	1/4W
R201	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R202	1-216-073-00	METAL CHIP	10K	5%	1/10W
R203	1-216-067-00	METAL CHIP	5.6K	5%	1/10W
R204	1-216-056-00	METAL GLAZE	2K	5%	1/10W
R205	1-216-054-00	METAL GLAZE	1.6K	5%	1/10W
R206	1-216-033-00	METAL CHIP	220	5%	1/10W
R207	1-216-025-00	METAL CHIP	100	5%	1/10W
R208	1-216-035-00	METAL CHIP	270	5%	1/10W
R209	1-216-097-00	METAL CHIP	100K	5%	1/10W
R210	1-216-097-00	METAL CHIP	100K	5%	1/10W
R211	1-216-065-00	METAL CHIP	4.7K	5%	1/10W
R212	1-216-077-00	METAL CHIP	15K	5%	1/10W
R213	1-216-075-00	METAL CHIP	12K	5%	1/10W
R214	1-216-039-00	METAL CHIP	390	5%	1/10W
R215	1-216-039-00	METAL CHIP	390	5%	1/10W
R216	1-216-045-00	METAL CHIP	680	5%	1/10W
R217	1-216-045-00	METAL CHIP	680	5%	1/10W
R218	1-216-045-00	METAL CHIP	680	5%	1/10W
R219	1-216-049-00	METAL CHIP	1K	5%	1/10W
R220	1-216-041-00	METAL CHIP	470	5%	1/10W
R221	1-216-049-00	METAL CHIP	1K	5%	1/10W
R222	1-216-033-00	METAL CHIP	220	5%	1/10W
R223	1-216-053-00	METAL CHIP	1.5K	5%	1/10W
R224	1-216-041-00	METAL CHIP	470	5%	1/10W
R225	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R227	1-249-429-11	CARBON	10K	5%	1/4W
R230	1-216-689-11	METAL CHIP	39K	0.5%	1/10W
R232	1-216-671-11	METAL CHIP	6.8K	0.5%	1/10W
R233	1-216-059-00	METAL CHIP	2.7K	5%	1/10W
R234	1-216-037-00	METAL CHIP	330	5%	1/10W
R235	1-216-069-00	METAL CHIP	6.8K	5%	1/10W
R236	1-216-059-00	METAL CHIP	2.7K	5%	1/10W
R237	1-216-051-00	METAL CHIP	1.2K	5%	1/10W
R238	1-216-065-00	METAL CHIP	4.7K	5%	1/10W
R239	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R240	1-216-671-11	METAL CHIP	6.8K	0.5%	1/10W
R241	1-216-675-11	METAL CHIP	10K	0.5%	1/10W
R242	1-216-093-00	METAL CHIP	68K	5%	1/10W
R244	1-216-057-00	METAL CHIP	2.2K	5%	1/10W

< VARIABLE RESISTOR >

RV101 1-241-120-11 RES, ADJ, CARBON 2.2K

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Ref. No.	Part No.	Description			Remark
*	1-413-752-21	SR-600 BOARD			
		**********			
		(Ref.No 6,000 Series)			
	9-902-059-01	CLIP, FUSE			

< CAPACITOR >

⚠C101	9-900-521-01	FILM	0.1uF		125V
⚠C102	9-900-521-01	FILM	0.1uF		125V
⚠C103	9-900-522-01	CERAMIC	2200pF		125V
⚠C104	9-900-522-01	CERAMIC	2200pF		125V
⚠C105	9-900-522-01	CERAMIC	2200pF		125V
⚠C106	9-902-523-01	ELECT	220uF		200V
C107	1-124-927-11	ELECT	4.7uF	20%	100V
C108	9-902-055-01	CERAMIC	100pF		1KV
C109	9-900-525-01	FILM	0.047uF		400V
C110	1-130-491-00	FILM	0.047uF	5%	50V
C111	1-130-491-00	FILM	0.047uF	5%	50V
C201	1-124-122-11	ELECT	100uF	20%	50V
C202	1-126-589-11	ELECT	2200uF	20%	16V
C203	1-126-101-11	ELECT	100uF	20%	16V
C204	1-126-101-11	ELECT	100uF	20%	16V
C205	1-126-101-11	ELECT	100uF	20%	16V
C206	1-124-760-11	ELECT	2200uF	20%	10V
C207	1-126-316-51	ELECT	470uF	20%	16V
C208	1-126-316-51	ELECT	470uF	20%	16V
C209	1-124-791-11	ELECT	1uF	20%	100V
C210	1-130-483-00	FILM	0.01uF	5%	50V
C211	1-124-122-11	ELECT	100uF	20%	50V
C212	1-124-471-00	ELECT	1000uF	20%	6.3V
C213	1-130-483-00	FILM	0.01uF	5%	50V
C214	1-130-483-00	FILM	0.01uF	5%	50V
C215	1-164-143-11	CERAMIC	1000pF	10%	1KV

< CONNECTOR >

CN1	9-902-075-01	CONNECTOR 13P
CN2	9-902-076-01	CONNECTOR 7P

< JACK >

⚠CNJ101 1-540-037-11 INLET 2P (AC IN ∿)

< DIODE >

⚠D101	1-809-505-11	DIODE	S1WBA60
⚠D102	9-996-310-01	DIODE	AG01A
D103	8-719-200-82	DIODE	11ES2
⚠D104	8-719-109-63	DIODE	RD3.0ESB2
⚠D105	8-719-911-19	DIODE	1SS119
D106	8-719-304-63	DIODE	RM11C

The components identified by mark ⚠ or dotted line with mark. ⚠ are critical for safety. Replace only with part number specified.	Les composants identifiés par une marque ⚠ sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

SR-600 SS-148

Ref. No.	Part No.	Description				Remark
⚠D201	8-719-313-16	DIODE	AU02A			
⚠D202	9-902-759-01	DIODE	MA2510			
⚠D203	9-902-061-01	DIODE	RG4Z			
⚠D204	8-719-301-45	DIODE	RK14			
⚠D205	8-719-313-16	DIODE	AU02A			
⚠D206	8-719-313-16	DIODE	AU02A			
⚠D207	8-719-981-01	DIODE	ERA81-004			
		< FUSE >				
⚠F101	1-532-743-11	FUSE, GLASS TUBE (2A 125V)				
		< BEAD CORE >				
FB1	9-902-053-01	CORE, BEAD				
		< IC >				
⚠IC201	9-901-942-01	IC	PQ12RF11			
⚠IC202	8-759-420-19	IC	AN1431T			
		< COIL >				
⚠L101	9-900-520-01	FILTER, LINE	ELF18D290A			
L201	9-900-539-01	COIL, CHOKE	10uH			
L202	9-902-762-01	COIL, CHOKE	20uH			
		< PHOTO CUPLER >				
⚠PC101	9-996-309-01	CUPLER, PHOTO	PS2501-01			
		< IC LINK >				
⚠PS201	1-532-637-21	LINK, IC				
		< TRANSISTOR >				
⚠Q101	8-729-905-86	TRANSISTOR	2SC4054N			
⚠Q102	9-900-517-01	TRANSISTOR	2SC3377			
⚠Q201	8-729-133-33	TRANSISTOR	2SC2333-K			
⚠Q202	8-729-900-80	TRANSISTOR	DTC114ES			
⚠Q203	9-902-760-01	TRANSISTOR	2SB1434-S			
⚠Q204	8-729-119-78	TRANSISTOR	2SC2785-HFE			
		< RESISTOR >				
R101	1-202-729-00	SOLID	6.8M	10%	1/2W	
R102	1-249-441-11	CARBON	100K	5%	1/4W	
R103	1-249-441-11	CARBON	100K	5%	1/4W	
R104	1-249-429-11	CARBON	10K	5%	1/4W	
R106	1-215-927-00	METAL	47K	5%	3W	
R107	1-215-863-11	METAL	100	5%	1W	
R109	1-249-413-11	CARBON	470	5%	1/4W	
R110	1-247-791-11	CARBON	22	5%	1/4W	
⚠R201	1-247-727-11	CARBON	10	5%	1/2W	F
R202	1-249-417-11	CARBON	1K	5%	1/4W	
R203	1-247-749-11	CARBON	560	5%	1/2W	
R204	1-247-735-11	CARBON	47	5%	1/2W	
R205	1-249-419-11	CARBON	1.5K	5%	1/4W	
R206	1-249-419-11	CARBON	1.5K	5%	1/4W	
R208	1-249-417-11	CARBON	1K	5%	1/4W	
R209	1-247-743-11	CARBON	220	5%	1/2W	
R210	1-249-429-11	CARBON	10K	5%	1/4W	
R211	1-249-429-11	CARBON	10K	5%	1/4W	
⚠R212	1-212-857-00	FUSE	10	5%	1/4W	F
⚠R213	1-212-934-00	FUSE	1.5	5%	1/2W	F
		< TRANSFORMER >				
⚠T101	9-902-758-01	TRANSFORMER, SWITCHING				
		< VARIABLE RESISTOR >				
VR201	9-902-761-01	RESISTOR, VARIABLE 200				
**********						
*	A-6754-467-A	SS-148 BOARD, COMPLETE				
		**********				
		(Ref. No 1,000 Series)				
		< CAPACITOR >				
C501	1-126-101-11	ELECT	100uF	20%	16V	
C510	1-130-482-00	MYLAR	0.0082uF	5%	50V	
C511	1-163-035-00	CERAMIC CHIP	0.047uF		50V	
C512	1-126-101-11	ELECT	100uF	20%	16V	
C514	1-130-493-00	MYLAR	0.068uF	5%	50V	
C520	1-163-119-00	CERAMIC CHIP	120PF	5%	50V	
C521	1-124-907-11	ELECT	10uF	20%	50V	
C530	1-124-925-11	ELECT	2.2uF	20%	100V	
C531	1-124-916-11	ELECT	22uF	20%	63V	
C532	1-124-907-11	ELECT	10uF	20%	50V	
C533	1-124-477-11	ELECT	47uF	20%	25V	
C534	1-124-925-11	ELECT	2.2uF	20%	100V	
C541	1-124-360-00	ELECT	1000uF	20%	16V	
C542	1-126-101-11	ELECT	100uF	20%	16V	
C543	1-163-031-11	CERAMIC CHIP	0.01uF		50V	
C560	1-163-031-11	CERAMIC CHIP	0.01uF		50V	
C561	1-124-477-11	ELECT	47uF	20%	25V	
C563	1-163-809-11	CERAMIC CHIP	0.047uF	10%	25V	
C564	1-163-809-11	CERAMIC CHIP	0.047uF	10%	25V	
C565	1-163-809-11	CERAMIC CHIP	0.047uF	10%	25V	
C566	1-163-809-11	CERAMIC CHIP	0.047uF	10%	25V	
C570	1-124-477-11	ELECT	47uF	20%	25V	
C571	1-124-499-11	ELECT, NONPOLAR	1uF	20%	50V	
C572	1-124-499-11	ELECT, NONPOLAR	1uF	20%	50V	
C573	1-124-477-11	ELECT	47uF	20%	25V	

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Ref. No.	Part No.	Description			Remark
C580	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C581	1-164-099-11	CERAMIC	0.0022uF	10%	50V
C582	1-164-099-11	CERAMIC	0.0022uF	10%	50V
		< CONNECTOR >			
CN501	1-695-347-21	PIN, CONNECTOR (PC BOARD) 24P			
* CN510	1-560-892-00	PIN, CONNECTOR 4P			
* CN511	1-560-892-00	PIN, CONNECTOR 4P			
CN512	1-564-006-71	PIN, CONNECTOR 7P			
* CN550	1-560-891-00	PIN, CONNECTOR 3P			
* CN551	1-560-891-00	PIN, CONNECTOR 3P			
* CN560	1-560-892-00	PIN, CONNECTOR 4P			
* CN561	1-560-891-00	PIN, CONNECTOR 3P			
* CN562	1-560-891-00	PIN, CONNECTOR 3P			
		< DIODE >			
D501	8-719-911-19	DIODE	1SS119		
D510	8-719-911-19	DIODE	1SS119		
D540	8-719-911-19	DIODE	1SS119		
D550	8-719-100-35	DIODE	RD5.6EB2		
		< IC >			
IC501	8-759-911-02	IC	TL092CP		
IC502	8-759-745-64	IC	NJM4560M		
IC503	8-759-978-27	IC	BA10324F		
IC550	8-759-821-82	IC	LB1644		
IC560	8-759-800-72	IC	LA7205		
IC561	8-759-982-73	IC	BA10393F		
		< COIL >			
⚠L501	1-408-710-00	COIL, CHOKE 90uH			
L560	1-410-673-31	INDUCTOR 68uH			
		< IC LINK >			
⚠PS550	1-532-685-00	LINK, IC (ICP-N20)			
		< TRANSISTOR >			
Q501	8-729-216-22	TRANSISTOR	2SA1162-G		
⚠Q502	8-729-177-22	TRANSISTOR	2SB772-Q		
⚠Q503	8-729-140-98	TRANSISTOR	2SD773-34		
⚠Q504	8-729-423-90	TRANSISTOR	2SD2136-P, Q, R(TA)		
Q505	8-729-120-28	TRANSISTOR	2SC1623-L5L6		
Q506	8-729-120-28	TRANSISTOR	2SC1623-L5L6		
		< RESISTOR >			
R501	1-216-061-00	METAL CHIP	3.3K	5%	1/10W
R502	1-216-061-00	METAL CHIP	3.3K	5%	1/10W
R503	1-216-037-00	METAL CHIP	330	5%	1/10W

Ref. No.	Part No.	Description			Remark
R504	1-216-061-00	METAL CHIP	3.3K	5%	1/10W
R505	1-216-073-00	METAL CHIP	10K	5%	1/10W
R506	1-216-049-00	METAL CHIP	1K	5%	1/10W
⚠R507	1-216-349-00	METAL OXIDE	1	5%	1W F
R510	1-216-095-00	METAL CHIP	82K	5%	1/10W
R511	1-216-663-11	METAL CHIP	3.3K	0.5%	1/10W
R512	1-216-673-11	METAL CHIP	8.2K	0.5%	1/10W
R513	1-216-663-11	METAL CHIP	3.3K	0.5%	1/10W
R514	1-216-673-11	METAL CHIP	8.2K	0.5%	1/10W
R515	1-216-689-11	METAL CHIP	39K	0.5%	1/10W
R516	1-216-085-00	METAL CHIP	33K	5%	1/10W
R520	1-216-079-00	METAL CHIP	18K	5%	1/10W
R521	1-216-077-00	METAL CHIP	15K	5%	1/10W
R522	1-216-065-00	METAL CHIP	4.7K	5%	1/10W
R523	1-216-075-00	METAL CHIP	12K	5%	1/10W
R530	1-216-095-00	METAL CHIP	82K	5%	1/10W
R531	1-216-077-00	METAL CHIP	15K	5%	1/10W
R532	1-216-079-00	METAL CHIP	18K	5%	1/10W
R533	1-216-073-00	METAL CHIP	10K	5%	1/10W
R534	1-216-073-00	METAL CHIP	10K	5%	1/10W
R535	1-216-073-00	METAL CHIP	10K	5%	1/10W
R536	1-216-049-00	METAL CHIP	1K	5%	1/10W
R537	1-216-049-00	METAL CHIP	1K	5%	1/10W
R538	1-216-090-00	METAL CHIP	51K	5%	1/10W
R539	1-216-055-00	METAL CHIP	1.8K	5%	1/10W
R540	1-216-101-00	METAL CHIP	150K	5%	1/10W
R541	1-216-093-00	METAL CHIP	68K	5%	1/10W
R542	1-216-077-00	METAL CHIP	15K	5%	1/10W
R543	1-216-081-00	METAL CHIP	22K	5%	1/10W
R545	1-216-117-00	METAL CHIP	680K	5%	1/10W
R546	1-216-079-00	METAL CHIP	18K	5%	1/10W
R547	1-216-077-00	METAL CHIP	15K	5%	1/10W
R548	1-216-109-00	METAL CHIP	330K	5%	1/10W
R550	1-249-417-11	CARBON	1K	5%	1/4W
R552	1-216-049-00	METAL CHIP	1K	5%	1/10W
R560	1-216-081-00	METAL CHIP	22K	5%	1/10W
R562	1-216-081-00	METAL CHIP	22K	5%	1/10W
R563	1-216-091-00	METAL CHIP	56K	5%	1/10W
R570	1-216-073-00	METAL CHIP	10K	5%	1/10W
R571	1-216-075-00	METAL CHIP	12K	5%	1/10W
R572	1-216-077-00	METAL CHIP	15K	5%	1/10W
R573	1-216-115-00	METAL CHIP	560K	5%	1/10W
R574	1-216-119-00	METAL CHIP	820K	5%	1/10W
R575	1-216-111-00	METAL CHIP	390K	5%	1/10W
R576	1-216-111-00	METAL CHIP	390K	5%	1/10W
R577	1-216-115-00	METAL CHIP	560K	5%	1/10W
R578	1-216-119-00	METAL CHIP	820K	5%	1/10W
R579	1-216-075-00	METAL CHIP	12K	5%	1/10W

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SS-148 TU-132

Ref. No.	Part No.	Description			Remark
R580	1-216-077-00	METAL CHIP	15K	5%	1/10W
R581	1-216-073-00	METAL CHIP	10K	5%	1/10W
R582	1-216-059-00	METAL CHIP	2.7K	5%	1/10W

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* A-6754-426-A TU-132 BOARD, COMPLETE

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(Ref. No 7,000 Series)

3-710-578-01 COVER, VOLUME, 6 MOLD

< CAPACITOR >

C001	1-124-126-00	ELECT	47uF	20%	10V
C002	1-126-163-11	ELECT	4.7uF	20%	50V
C003	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C004	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V
C005	1-126-101-11	ELECT	100uF	20%	16V
C007	1-163-108-00	CERAMIC CHIP	43PF	5%	50V
C008	1-163-108-00	CERAMIC CHIP	43PF	5%	50V
C011	1-163-131-00	CERAMIC CHIP	390PF	5%	50V
C012	1-163-131-00	CERAMIC CHIP	390PF	5%	50V
C014	1-124-126-00	ELECT	47uF	20%	10V
C016	1-124-126-00	ELECT	47uF	20%	10V
C019	1-163-019-00	CERAMIC CHIP	0.0068uF	10%	50V
C020	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C021	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C022	1-163-117-00	CERAMIC CHIP	100PF	5%	50V
C023	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C024	1-163-019-00	CERAMIC CHIP	0.0068uF	10%	50V
C025	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C026	1-163-229-11	CERAMIC CHIP	12PF	5%	50V
C027	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C028	1-163-091-00	CERAMIC CHIP	8PF		50V
C029	1-124-443-00	ELECT	100uF	20%	10V
C030	1-124-907-11	ELECT	10uF	20%	50V
C031	1-163-033-00	CERAMIC CHIP	0.022uF		50V
C032	1-164-222-11	CERAMIC CHIP	0.22uF		25V
C033	1-124-126-00	ELECT	47uF	20%	10V
C034	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C035	1-124-250-00	ELECT	0.15uF	20%	50V
C036	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C037	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V
C038	1-124-903-11	ELECT	1uF	20%	50V
C039	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C040	1-124-126-00	ELECT	47uF	20%	10V
C041	1-124-902-00	ELECT	0.47uF	20%	50V
C043	1-163-229-11	CERAMIC CHIP	12PF	5%	50V
C044	1-163-113-00	CERAMIC CHIP	68PF	5%	50V
C045	1-124-907-11	ELECT	10uF	20%	50V
C046	1-124-126-00	ELECT	47uF	20%	10V

Ref. No.	Part No.	Description			Remark
C070	1-130-484-00	MYLAR	0.012uF	5%	50V
C071	1-130-480-00	MYLAR	0.0056uF	5%	50V
C072	1-124-252-00	ELECT	0.33uF	20%	50V
C073	1-124-907-11	ELECT	10uF	20%	50V
C074	1-124-907-11	ELECT	10uF	20%	50V
C075	1-130-476-00	MYLAR	0.0027uF	5%	50V
C076	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C077	1-124-907-11	ELECT	10uF	20%	50V
C078	1-131-365-00	TANTALUM	10uF	10%	20V
C079	1-124-903-11	ELECT	1uF	20%	50V
C080	1-131-368-00	TANTALUM	3.3uF	10%	16V
C081	1-124-907-11	ELECT	10uF	20%	50V
C082	1-124-907-11	ELECT	10uF	20%	50V
C083	1-163-075-00	CERAMIC CHIP	0.047uF		50V
C084	1-124-927-11	ELECT	4.7uF	20%	100V
C085	1-124-902-00	ELECT	0.47uF	20%	50V
C086	1-124-903-11	ELECT	1uF	20%	50V
C087	1-126-157-11	ELECT	10uF	20%	16V
C088	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C089	1-126-162-11	ELECT	3.3uF	20%	50V
C090	1-163-989-11	CERAMIC CHIP	0.033uF	10%	25V
C091	1-124-907-11	ELECT	10uF	20%	50V
C092	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C098	1-124-916-11	ELECT	22uF	20%	63V

< FILTER >

CF001	1-577-559-11	FILTER, CERAMIC
CF002	1-409-332-00	CERAMIC TRAP
CF003	1-527-943-00	FILTER, CERAMIC

< CONNECTOR >

CN001	1-573-826-11	CONNECTOR, BOARD TO BOARD 12P
CN002	1-573-826-11	CONNECTOR, BOARD TO BOARD 12P

< DIODE >

⚠D001	8-719-929-71	DIODE	HZS33NB1
D005	8-719-104-34	DIODE	1S2836
D006	8-719-104-34	DIODE	1S2836
D007	8-719-800-76	DIODE	1SS226

< IC >

IC001	8-759-630-93	IC	M51362SP
IC002	8-752-053-58	IC	CXA1124AS
IC003	8-759-729-03	IC	NJM2903D

< JUMPER RESISTOR >

JP002	1-216-296-00	METAL CHIP	0	5%	1/8W
JP004	1-216-295-00	METAL CHIP	0	5%	1/10W

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Ref. No.	Part No.	Description			Remark
JP006	1-216-296-00	METAL CHIP	0	5%	1/8W
JP007	1-216-296-00	METAL CHIP	0	5%	1/8W
JP008	1-216-295-00	METAL CHIP	0	5%	1/10W
JP009	1-216-296-00	METAL CHIP	0	5%	1/8W
JP010	1-216-296-00	METAL CHIP	0	5%	1/8W
JP011	1-216-296-00	METAL CHIP	0	5%	1/8W
JP012	1-216-296-00	METAL CHIP	0	5%	1/8W
JP013	1-216-295-00	METAL CHIP	0	5%	1/10W
JP014	1-216-296-00	METAL CHIP	0	5%	1/8W
JP015	1-216-296-00	METAL CHIP	0	5%	1/8W
JP016	1-216-295-00	METAL CHIP	0	5%	1/10W
JP017	1-216-295-00	METAL CHIP	0	5%	1/10W
JP018	1-216-296-00	METAL CHIP	0	5%	1/8W
JP019	1-216-296-00	METAL CHIP	0	5%	1/8W
JP020	1-216-296-00	METAL CHIP	0	5%	1/8W
JP021	1-216-295-00	METAL CHIP	0	5%	1/10W
JP022	1-216-295-00	METAL CHIP	0	5%	1/10W
JP023	1-216-296-00	METAL CHIP	0	5%	1/8W
JP024	1-216-295-00	METAL CHIP	0	5%	1/10W
JP025	1-216-296-00	METAL CHIP	0	5%	1/8W
JP026	1-216-296-00	METAL CHIP	0	5%	1/8W
JP027	1-216-295-00	METAL CHIP	0	5%	1/10W
JP028	1-216-296-00	METAL CHIP	0	5%	1/8W
JP029	1-216-296-00	METAL CHIP	0	5%	1/8W
JP030	1-216-296-00	METAL CHIP	0	5%	1/8W
JP031	1-216-295-00	METAL CHIP	0	5%	1/10W

< COIL >

L001	1-408-409-00	INDUCTOR 10uH
L002	1-410-977-11	INDUCTOR 100uH
L003	1-408-413-00	INDUCTOR 22uH
L004	1-408-409-00	INDUCTOR 10uH
L005	1-410-971-11	INDUCTOR 10uH
L006	1-410-787-31	INDUCTOR 0.33uH
L007	1-410-965-21	INDUCTOR 1uH
L008	1-410-972-11	INDUCTOR 15uH
L010	1-410-971-11	INDUCTOR 10uH
L011	1-410-971-11	INDUCTOR 10uH
L020	1-410-967-11	INDUCTOR 2.2uH
L098	1-412-292-11	INDUCTOR 1.2uH

< TRANSISTOR >

⚠Q001	8-729-173-38	TRANSISTOR	2SA733-K
Q002	8-729-421-19	TRANSISTOR	UN2213
Q005	8-729-822-90	TRANSISTOR	2SC3779C
Q006	8-729-822-90	TRANSISTOR	2SC3779C
Q007	8-729-422-27	TRANSISTOR	2SD601A-Q
Q008	8-729-422-27	TRANSISTOR	2SD601A-Q
Q009	8-729-422-27	TRANSISTOR	2SD601A-Q
Q070	8-729-422-27	TRANSISTOR	2SD601A-Q
Q071	8-729-421-19	TRANSISTOR	UN2213

< RESISTOR >

R001	1-216-085-00	METAL CHIP	33K	5%	1/10W
R002	1-216-089-00	METAL CHIP	47K	5%	1/10W
R003	1-216-037-00	METAL CHIP	330	5%	1/10W
R004	1-216-035-00	METAL CHIP	270	5%	1/10W
R005	1-216-025-00	METAL CHIP	100	5%	1/10W
R006	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R008	1-216-049-00	METAL CHIP	1K	5%	1/10W
R009	1-216-049-00	METAL CHIP	1K	5%	1/10W
R010	1-216-033-00	METAL CHIP	220	5%	1/10W
R012	1-216-081-00	METAL CHIP	22K	5%	1/10W
R013	1-216-063-00	METAL CHIP	3.9K	5%	1/10W
R014	1-216-065-00	METAL CHIP	4.7K	5%	1/10W
R015	1-216-081-00	METAL CHIP	22K	5%	1/10W
R016	1-216-081-00	METAL CHIP	22K	5%	1/10W
R018	1-216-083-00	METAL CHIP	27K	5%	1/10W
R019	1-216-089-00	METAL CHIP	47K	5%	1/10W
R020	1-216-081-00	METAL CHIP	22K	5%	1/10W
R023	1-216-081-00	METAL CHIP	22K	5%	1/10W
R025	1-216-081-00	METAL CHIP	22K	5%	1/10W
R029	1-216-065-00	METAL CHIP	4.7K	5%	1/10W
R030	1-216-055-00	METAL CHIP	1.8K	5%	1/10W
R031	1-216-061-00	METAL CHIP	3.3K	5%	1/10W
R032	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R033	1-216-017-00	METAL CHIP	47	5%	1/10W
R034	1-216-105-00	METAL CHIP	220K	5%	1/10W
R035	1-216-105-00	METAL CHIP	220K	5%	1/10W
R036	1-216-063-00	METAL CHIP	3.9K	5%	1/10W
R038	1-216-089-00	METAL CHIP	47K	5%	1/10W
R039	1-216-043-00	METAL CHIP	560	5%	1/10W
R040	1-216-025-00	METAL CHIP	100	5%	1/10W
R041	1-216-037-00	METAL CHIP	330	5%	1/10W
R042	1-216-055-00	METAL CHIP	1.8K	5%	1/10W
R043	1-216-037-00	METAL CHIP	330	5%	1/10W
R044	1-216-037-00	METAL CHIP	330	5%	1/10W
R046	1-216-119-00	METAL CHIP	820K	5%	1/10W
R047	1-216-037-00	METAL CHIP	330	5%	1/10W
R048	1-216-063-00	METAL CHIP	3.9K	5%	1/10W
R049	1-216-061-00	METAL CHIP	3.3K	5%	1/10W
R050	1-216-069-00	METAL CHIP	6.8K	5%	1/10W
R051	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R053	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R054	1-216-029-00	METAL CHIP	150	5%	1/10W
R055	1-216-039-00	METAL CHIP	390	5%	1/10W
R056	1-216-061-00	METAL CHIP	3.3K	5%	1/10W

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TU-132 YC-128

Ref. No.	Part No.	Description			Remark
R057	1-216-067-00	METAL CHIP	5.6K	5%	1/10W
R058	1-216-037-00	METAL CHIP	330	5%	1/10W
R059	1-216-037-00	METAL CHIP	330	5%	1/10W
R060	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R061	1-216-047-00	METAL CHIP	820	5%	1/10W
R062	1-216-055-00	METAL CHIP	1.8K	5%	1/10W
R063	1-216-021-00	METAL CHIP	68	5%	1/10W
R064	1-216-025-00	METAL CHIP	100	5%	1/10W
R065	1-216-071-00	METAL CHIP	8.2K	5%	1/10W
R070	1-216-097-00	METAL CHIP	100K	5%	1/10W
R071	1-216-121-00	METAL CHIP	1M	5%	1/10W
R072	1-216-690-11	METAL CHIP	43K	0.5%	1/10W
R073	1-216-061-00	METAL CHIP	3.3K	5%	1/10W
R074	1-216-063-00	METAL CHIP	3.9K	5%	1/10W
R075	1-216-073-00	METAL CHIP	10K	5%	1/10W
R076	1-216-097-00	METAL CHIP	100K	5%	1/10W
R077	1-216-065-00	METAL CHIP	4.7K	5%	1/10W
R078	1-216-117-00	METAL CHIP	680K	5%	1/10W
R079	1-216-691-11	METAL CHIP	47K	0.5%	1/10W
R080	1-216-691-11	METAL CHIP	47K	0.5%	1/10W
R081	1-216-089-00	METAL CHIP	47K	5%	1/10W
R082	1-216-065-00	METAL CHIP	4.7K	5%	1/10W
R083	1-216-063-00	METAL CHIP	3.9K	5%	1/10W
R084	1-216-049-00	METAL CHIP	1K	5%	1/10W
R085	1-216-073-00	METAL CHIP	10K	5%	1/10W
R086	1-216-063-00	METAL CHIP	3.9K	5%	1/10W
R087	1-216-077-00	METAL CHIP	15K	5%	1/10W
R089	1-216-073-00	METAL CHIP	10K	5%	1/10W
R098	1-216-055-00	METAL CHIP	1.8K	5%	1/10W
R099	1-216-079-00	METAL CHIP	18K	5%	1/10W

< VARIABLE RESISTOR >

RV001	1-241-630-11	RES, ADJ, CARBON 10K
RV002	1-241-079-11	RES, ADJ, CARBON 4.7K
RV070	1-228-993-00	RES, ADJ, METAL 4.7K
RV071	1-228-995-00	RES, ADJ, METAL 22K
RV072	1-228-996-00	RES, ADJ, METAL 47K
RV073	1-241-630-11	RES, ADJ, CARBON 10K

< SURFACE WAVE FILTER >

SWF001	1-404-971-11	FILTER, SURFACE WAVE

< TRANSFORMER >

T001	1-404-749-11	COIL
T002	1-404-802-11	COIL
T003	1-404-752-11	COIL
T004	1-404-744-11	COIL, IF

Ref. No.	Part No.	Description			Remark
		< TUNER >			
⚠TU001	1-465-239-21	TUNER, ET			

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* A-6754-506-A YC-128 BOARD, COMPLETE

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(Ref. No 8,000 Series)

< CAPACITOR >

C101	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C102	1-124-499-11	ELECT, NONPOLAR	1uF	20%	50V
C103	1-163-099-00	CERAMIC CHIP	18PF	5%	50V
C104	1-163-125-00	CERAMIC CHIP	220PF	5%	50V
C105	1-124-443-00	ELECT	100uF	20%	10V
C106	1-124-767-00	ELECT	2.2uF	20%	50V
C107	1-124-257-00	ELECT	2.2uF	20%	50V
C108	1-164-222-11	CERAMIC CHIP	0.22uF		25V
C109	1-163-105-00	CERAMIC CHIP	33PF	5%	50V
C110	1-163-113-00	CERAMIC CHIP	68PF	5%	50V
C111	1-163-099-00	CERAMIC CHIP	18PF	5%	50V
C112	1-163-133-00	CERAMIC CHIP	470PF	5%	50V
C115	1-130-493-00	MYLAR	0.068uF	5%	50V
C116	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C117	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C118	1-124-927-11	ELECT	4.7uF	20%	100V
C119	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C120	1-124-443-00	ELECT	100uF	20%	10V
C121	1-124-907-11	ELECT	10uF	20%	50V
C122	1-124-925-11	ELECT	2.2uF	20%	100V
C123	1-163-125-00	CERAMIC CHIP	220PF	5%	50V
C124	1-163-107-00	CERAMIC CHIP	39PF	5%	50V
C125	1-124-902-00	ELECT	0.47uF	20%	50V
C126	1-124-907-11	ELECT	10uF	20%	50V
C127	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C130	1-163-102-00	CERAMIC CHIP	24PF	5%	50V
C131	1-163-115-00	CERAMIC CHIP	82PF	5%	50V
C133	1-163-102-00	CERAMIC CHIP	24PF	5%	50V
C134	1-164-337-11	CERAMIC CHIP	2.2uF		16V
C135	1-124-589-11	ELECT	47uF	20%	16V
C136	1-126-301-11	ELECT	1uF	20%	50V
C137	1-126-163-11	ELECT	4.7uF	20%	50V
C138	1-162-306-11	CERAMIC	0.01uF	20%	16V
C139	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C145	1-126-320-11	ELECT, NONPOLAR	10uF	20%	16V
C146	1-124-903-11	ELECT	1uF	20%	50V
C147	1-163-116-00	CERAMIC CHIP	91PF	5%	50V
C148	1-163-129-00	CERAMIC CHIP	330PF	5%	50V
C149	1-163-126-00	CERAMIC CHIP	240PF	5%	50V
C150	1-164-693-11	CERAMIC CHIP	0.0018uF	5%	50V

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety. Replace only with part number specified.

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Ref. No.	Part No.	Description			Remark
C151	1-163-131-00	CERAMIC CHIP	390PF	5%	50V
C152	1-163-132-00	CERAMIC CHIP	430PF	5%	50V
C160	1-124-927-11	ELECT	4.7uF	20%	100V
C161	1-163-127-00	CERAMIC CHIP	270PF	5%	50V
C162	1-163-107-00	CERAMIC CHIP	39PF	5%	50V
C163	1-163-119-00	CERAMIC CHIP	120PF	5%	50V
C164	1-163-139-00	CERAMIC CHIP	820PF	5%	50V
C166	1-163-126-00	CERAMIC CHIP	240PF	5%	50V
C167	1-163-119-00	CERAMIC CHIP	120PF	5%	50V
C168	1-163-126-00	CERAMIC CHIP	240PF	5%	50V
C169	1-126-157-11	ELECT	10uF	20%	16V
C170	1-163-102-00	CERAMIC CHIP	24PF	5%	50V
C175	1-163-123-00	CERAMIC CHIP	180PF	5%	50V
C176	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C201	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C202	1-163-809-11	CERAMIC CHIP	0.047uF	10%	25V
C203	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C204	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C205	1-126-301-11	ELECT	1uF	20%	50V
C206	1-163-117-00	CERAMIC CHIP	100PF	5%	50V
C207	1-126-301-11	ELECT	1uF	20%	50V
C211	1-163-121-00	CERAMIC CHIP	150PF	5%	50V
C212	1-163-123-00	CERAMIC CHIP	180PF	5%	50V
C213	1-163-133-00	CERAMIC CHIP	470PF	5%	50V
C220	1-126-301-11	ELECT	1uF	20%	50V
C221	1-163-037-11	CERAMIC CHIP	0.022uF	10%	25V
C222	1-163-809-11	CERAMIC CHIP	0.047uF	10%	25V
C223	1-162-306-11	CERAMIC	0.01uF	20%	16V
C230	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C231	1-163-037-11	CERAMIC CHIP	0.022uF	10%	25V
C232	1-124-903-11	ELECT	1uF	20%	50V
C233	1-124-443-00	ELECT	100uF	20%	10V
C234	1-163-243-11	CERAMIC CHIP	47PF	5%	50V
C235	1-163-127-00	CERAMIC CHIP	270PF	5%	50V
C236	1-163-086-00	CERAMIC CHIP	3PF		50V
C237	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C238	1-163-117-00	CERAMIC CHIP	100PF	5%	50V
C239	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C240	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C245	1-124-907-11	ELECT	10uF	20%	50V
C246	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C247	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C270	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C271	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C272	1-126-176-11	ELECT	220uF	20%	10V
C273	1-126-154-11	ELECT	47uF	20%	6.3V

Ref. No.	Part No.	Description	Remark
		< CONNECTOR >	
CN001	1-573-826-11	CONNECTOR, BOARD TO BOARD 12P	
CN002	1-573-828-11	CONNECTOR, BOARD TO BOARD 14P	
		< DIODE >	
D101	8-719-911-19	DIODE 1SS119	
D102	8-719-911-19	DIODE 1SS119	
D105	8-719-911-19	DIODE 1SS119	
D111	8-719-911-19	DIODE 1SS119	
D112	8-719-911-19	DIODE 1SS119	
D220	8-719-200-82	DIODE 11ES2	
		< DELAY LINE >	
DL201	1-415-668-31	DELAY LINE, ULTRASONIC	
		< FILTER >	
FL101	1-236-548-31	LPF	
FL201	1-236-513-11	BPF, C	
FL202	1-239-602-11	ENCAPSULATED COMPONENT	
		< IC >	
IC101	8-759-822-41	IC LA7083	
IC102	8-759-821-50	IC LC8991	
IC103	8-759-821-54	IC LA7066	
IC201	8-759-822-59	IC LA7075A	
⚠IC210	8-759-701-56	IC NJM78M05FA	
		< JUMPER RESISTOR >	
JR101	1-216-296-00	METAL CHIP 0 5%	1/8W
JR102	1-216-295-00	METAL CHIP 0 5%	1/10W
JR103	1-216-296-00	METAL CHIP 0 5%	1/8W
JR104	1-216-296-00	METAL CHIP 0 5%	1/8W
JR105	1-216-296-00	METAL CHIP 0 5%	1/8W
JR106	1-216-296-00	METAL CHIP 0 5%	1/8W
JR108	1-216-296-00	METAL CHIP 0 5%	1/8W
JR109	1-216-295-00	METAL CHIP 0 5%	1/10W
JR110	1-216-295-00	METAL CHIP 0 5%	1/10W
JR112	1-216-295-00	METAL CHIP 0 5%	1/10W
		< COIL >	
L101	1-410-521-11	INDUCTOR 100uH	
L102	1-410-513-11	INDUCTOR 22uH	
L105	1-410-519-11	INDUCTOR 68uH	
L106	1-410-519-11	INDUCTOR 68uH	
L107	1-410-521-11	INDUCTOR 100uH	
L110	1-410-513-11	INDUCTOR 22uH	
L111	1-410-509-11	INDUCTOR 10uH	
L115	1-410-521-11	INDUCTOR 100uH	

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Ref. No.	Part No.	Description	Remark
L116	1-410-512-11	INDUCTOR 18uH	
L201	1-408-424-00	INDUCTOR 180uH	
L205	1-410-511-11	INDUCTOR 15uH	
L206	1-410-500-11	INDUCTOR 1.8uH	
		< TRANSISTOR >	
Q101	8-729-216-22	TRANSISTOR 2SA1162-G	
Q102	8-729-424-59	TRANSISTOR UN2212	
Q103	8-729-424-59	TRANSISTOR UN2212	
Q104	8-729-421-19	TRANSISTOR UN2213	
Q105	8-729-421-19	TRANSISTOR UN2213	
Q106	8-729-216-22	TRANSISTOR 2SA1162-G	
Q110	8-729-216-22	TRANSISTOR 2SA1162-G	
Q111	8-729-120-28	TRANSISTOR 2SC1623-L5L6	
Q120	8-729-424-08	TRANSISTOR UN2111	
Q122	8-729-424-12	TRANSISTOR UN2112	
Q125	8-729-216-22	TRANSISTOR 2SA1162-G	
Q126	8-729-120-28	TRANSISTOR 2SC1623-L5L6	
Q127	8-729-424-59	TRANSISTOR UN2212	
Q128	8-729-120-28	TRANSISTOR 2SC1623-L5L6	
Q129	8-729-120-28	TRANSISTOR 2SC1623-L5L6	
Q130	8-729-421-16	TRANSISTOR UN221D	
Q201	8-729-120-28	TRANSISTOR 2SC1623-L5L6	
Q202	8-729-120-28	TRANSISTOR 2SC1623-L5L6	
Q210	8-729-120-28	TRANSISTOR 2SC1623-L5L6	
Q211	8-729-216-22	TRANSISTOR 2SA1162-G	
Q212	8-729-424-59	TRANSISTOR UN2212	
Q213	8-729-421-19	TRANSISTOR UN2213	
Q214	8-729-421-19	TRANSISTOR UN2213	
Q215	8-729-421-16	TRANSISTOR UN221D	
Q250	8-729-424-08	TRANSISTOR UN2111	
Q251	8-729-421-19	TRANSISTOR UN2213	
Q260	8-729-421-19	TRANSISTOR UN2213	
		< RESISTOR >	
R101	1-216-049-00	METAL CHIP 1K 5% 1/10W	
R102	1-216-121-00	METAL CHIP 1M 5% 1/10W	
R103	1-216-042-00	METAL CHIP 510 5% 1/10W	
R104	1-216-042-00	METAL CHIP 510 5% 1/10W	
R105	1-216-037-00	METAL CHIP 330 5% 1/10W	
R106	1-216-121-00	METAL CHIP 1M 5% 1/10W	
R107	1-216-121-00	METAL CHIP 1M 5% 1/10W	
R108	1-216-049-00	METAL CHIP 1K 5% 1/10W	
R109	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R110	1-216-051-00	METAL CHIP 1.2K 5% 1/10W	
R111	1-216-085-00	METAL CHIP 33K 5% 1/10W	
R112	1-216-045-00	METAL CHIP 680 5% 1/10W	
R113	1-216-065-00	METAL CHIP 4.7K 5% 1/10W	
R114	1-216-057-00	METAL CHIP 2.2K 5% 1/10W	

Ref. No.	Part No.	Description	Remark
R115	1-216-105-00	METAL CHIP 220K 5% 1/10W	
R116	1-216-101-00	METAL CHIP 150K 5% 1/10W	
R117	1-216-041-00	METAL CHIP 470 5% 1/10W	
R118	1-216-049-00	METAL CHIP 1K 5% 1/10W	
R119	1-216-049-00	METAL CHIP 1K 5% 1/10W	
R120	1-216-049-00	METAL CHIP 1K 5% 1/10W	
R122	1-216-009-00	METAL CHIP 22 5% 1/10W	
R125	1-216-049-00	METAL CHIP 1K 5% 1/10W	
R126	1-216-049-00	METAL CHIP 1K 5% 1/10W	
R135	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R136	1-216-660-11	METAL CHIP 2.4K 0.5% 1/10W	
R137	1-216-651-11	METAL CHIP 1K 0.5% 1/10W	
R138	1-216-657-11	METAL CHIP 1.8K 0.5% 1/10W	
R139	1-216-652-11	METAL CHIP 1.1K 0.5% 1/10W	
R140	1-216-653-11	METAL CHIP 1.2K 0.5% 1/10W	
R141	1-216-631-11	METAL CHIP 150 0.5% 1/10W	
R142	1-216-659-11	METAL CHIP 2.2K 0.5% 1/10W	
R143	1-216-661-11	METAL CHIP 2.7K 0.5% 1/10W	
R144	1-216-653-11	METAL CHIP 1.2K 0.5% 1/10W	
R145	1-216-015-00	METAL CHIP 39 5% 1/10W	
R146	1-216-097-00	METAL CHIP 100K 5% 1/10W	
R147	1-216-661-11	METAL CHIP 2.7K 0.5% 1/10W	
R148	1-216-663-11	METAL CHIP 3.3K 0.5% 1/10W	
R155	1-216-051-00	METAL CHIP 1.2K 5% 1/10W	
R156	1-216-113-00	METAL CHIP 470K 5% 1/10W	
R157	1-216-651-11	METAL CHIP 1K 0.5% 1/10W	
R158	1-216-659-11	METAL CHIP 2.2K 0.5% 1/10W	
R159	1-216-653-11	METAL CHIP 1.2K 0.5% 1/10W	
R160	1-216-055-00	METAL CHIP 1.8K 5% 1/10W	
R161	1-216-065-00	METAL CHIP 4.7K 5% 1/10W	
R162	1-216-663-11	METAL CHIP 3.3K 0.5% 1/10W	
R163	1-216-660-11	METAL CHIP 2.4K 0.5% 1/10W	
R164	1-216-659-11	METAL CHIP 2.2K 0.5% 1/10W	
R165	1-216-031-00	METAL CHIP 180 5% 1/10W	
R166	1-216-655-11	METAL CHIP 1.5K 0.5% 1/10W	
R167	1-216-035-00	METAL CHIP 270 5% 1/10W	
R168	1-216-655-11	METAL CHIP 1.5K 0.5% 1/10W	
R169	1-249-419-11	CARBON 1.5K 5% 1/4W	
R170	1-216-059-00	METAL CHIP 2.7K 5% 1/10W	
R171	1-216-061-00	METAL CHIP 3.3K 5% 1/10W	
R172	1-216-097-00	METAL CHIP 100K 5% 1/10W	
R173	1-216-059-00	METAL CHIP 2.7K 5% 1/10W	
R180	1-216-069-00	METAL CHIP 6.8K 5% 1/10W	
R181	1-216-059-00	METAL CHIP 2.7K 5% 1/10W	
R182	1-216-040-00	METAL GLAZE 430 5% 1/10W	
R183	1-216-049-00	METAL CHIP 1K 5% 1/10W	
R184	1-216-057-00	METAL CHIP 2.2K 5% 1/10W	
R185	1-216-089-00	METAL CHIP 47K 5% 1/10W	
R186	1-216-081-00	METAL CHIP 22K 5% 1/10W	

Ref. No.	Part No.	Description			Remark
R201	1-216-039-00	METAL CHIP	390	5%	1/10W
R202	1-216-041-00	METAL CHIP	470	5%	1/10W
R203	1-216-041-00	METAL CHIP	470	5%	1/10W
R204	1-216-081-00	METAL CHIP	22K	5%	1/10W
R205	1-216-081-00	METAL CHIP	22K	5%	1/10W
R206	1-216-049-00	METAL CHIP	1K	5%	1/10W
R207	1-216-081-00	METAL CHIP	22K	5%	1/10W
R210	1-216-049-00	METAL CHIP	1K	5%	1/10W
R211	1-216-049-00	METAL CHIP	1K	5%	1/10W
R212	1-216-295-00	METAL CHIP	0	5%	1/10W
R215	1-216-051-00	METAL CHIP	1.2K	5%	1/10W
R216	1-216-073-00	METAL CHIP	10K	5%	1/10W
R224	1-216-081-00	METAL CHIP	22K	5%	1/10W
R225	1-249-433-11	CARBON	22K	5%	1/4W
R226	1-216-071-00	METAL CHIP	8.2K	5%	1/10W
R235	1-216-105-00	METAL CHIP	220K	5%	1/10W
R236	1-216-097-00	METAL CHIP	100K	5%	1/10W
R237	1-216-043-00	METAL CHIP	560	5%	1/10W
R245	1-216-049-00	METAL CHIP	1K	5%	1/10W
R246	1-216-049-00	METAL CHIP	1K	5%	1/10W
R247	1-216-049-00	METAL CHIP	1K	5%	1/10W
R248	1-216-060-00	METAL GLAZE	3K	5%	1/10W
R249	1-216-069-00	METAL CHIP	6.8K	5%	1/10W
R255	1-216-073-00	METAL CHIP	10K	5%	1/10W
R256	1-216-067-00	METAL CHIP	5.6K	5%	1/10W
R257	1-216-085-00	METAL CHIP	33K	5%	1/10W
R258	1-216-067-00	METAL CHIP	5.6K	5%	1/10W
R270	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R271	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R280	1-216-073-00	METAL CHIP	10K	5%	1/10W

< VARIABLE RESISTOR >

RV101	1-241-627-11	RES, ADJ, CARBON 1K
RV102	1-241-629-11	RES, ADJ, CARBON 4.7K
RV104	1-241-627-11	RES, ADJ, CARBON 1K
RV105	1-241-627-11	RES, ADJ, CARBON 1K
RV106	1-241-630-11	RES, ADJ, CARBON 10K
RV201	1-241-627-11	RES, ADJ, CARBON 1K

< VIBRATOR >

X201	1-577-380-11	VIBRATOR, CRYSTAL (3.58MHz)

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MISCELLANEOUS

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⚠53	1-413-752-21	POWER BLOCK(SWITCHING REGULATER) (SR-600)
716	1-690-503-11	WIRE, FLAT TYPE (24 CORE)
718	1-555-110-00	CABLE, PIN
223	X-3716-014-1	SENSOR ASSY, T
229	1-464-781-11	SENSOR, COIL
⚠311	A-6050-640-A	DRUM ASSY (DFH-01A-R)
M901	1-541-615-22	MOTOR, DC (E20EL50)
⚠M902	8-835-272-01	MOTOR, DC BHF-1921A (CAPSTAN)
⚠M903	A-4910-063-B	REEL MOTOR BOARD, COMPLETE
M904	X-3716-074-1	MOTOR ASSY, L (LOADING)
M905	A-6706-852-A	MOTOR UNIT BLOCK ASSY, L (CAM)
S901	1-571-023-11	SWITCH, LEAF (2 GANG)
S902	1-571-024-11	SWITCH, ROTARY (ENCORD)

****

ACCESSORIES & PACKING MATERIALS

****

	1-417-139-11	MATCHING TRANSFORMER, ANTENNA
	1-466-942-11	REMOTE COMMANDER (RMT-V128)
	3-744-081-11	COVER, BATTERY
	1-575-334-11	CORD, CONNECTION (A/V cable)
⚠	1-590-135-31	CORD, POWER
	1-696-592-11	CORD, CONNECTION (NTSC) (RF cable)
	3-756-295-21	MANUAL, INSTRUCTION (ENGLISH)
	3-756-295-31	MANUAL, INSTRUCTION (FRENCH) (Canadian)
*	3-795-581-21	SAFEGUARD (SONY), IMPORTANT (US)
*	3-953-660-01	CUSHION (UPPER)
*	3-953-661-01	CUSHION (LOWER)
*	3-954-611-01	INDIVIDUAL CARTON

****

****

HARDWARE LIST

****

#1	7-621-255-25	SCREW +PTT 2X4 (S)
#2	7-685-648-71	SCREW +BVTP 3X12 TYPE2 IT-3
#3	7-682-550-04	SCREW +BVTT 3X12 (S)
#4	7-685-646-79	SCREW +BVTP 3X8 TYPE2 IT-3
#5	7-685-651-79	SCREW +BVTP 3X20 TYPE2 IT-3
#6	7-685-648-79	SCREW +BVTP 3X12 TYPE2 IT-3
#7	7-682-645-01	SCREW +PS 3X4
#8	7-682-647-01	SCREW +PS 3X6
#9	7-621-255-45	SCREW, + PW2
#10	7-621-770-87	SCREW (2.6X5), W (+) P
#11	7-621-712-46	SET-SCREW, SLOT 2.6X5FLAT POINT
#12	7-624-105-04	STOP RING 2.3, TYPE -E
#13	7-685-134-19	SCREW +P 2.6X8 TYPE2 NON-SLIT
#14	7-621-759-35	SCREW (P2.6X5), (+)
#15	7-682-146-01	SCREW +P 3X5
#16	7-621-255-15	SCREW +P 2X3
#17	7-688-004-11	W 4, MIDDLE
#18	7-684-024-04	N 4, TYPE 2
#19	7-683-404-04	BOLT, HEXAGON SOCKET 3X8
#20	7-685-861-01	SCREW +BVTT 2.6X5 (S)

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety. Replace only with	Les composants identifiés par une marque ⚠ sont critiques pour la sécurité. Ne les remplacer que par une pièce

SECTION 7
MECHANICAL ADJUSTMENTS

7-1. PREPARATION FOR MECHANICAL PART CHECKS, ADJUSTMENTS AND REPLACEMENT

Note : For information on how to remove the cabinet and boards, refer to Section 2. DISASSEMBLY.

7-1-1. How to Complete Tape Threading with FL Cassette Compartment Removed

1) Turn on the POWER switch.
2) First push down the erase protection switch ❶, then push down the cassette down switch ❷ to thread the tape.

Note : Do not thread or unthread the tape with the set wrong side up.

[How to eject tape in this state]

• Press the EJECT button.

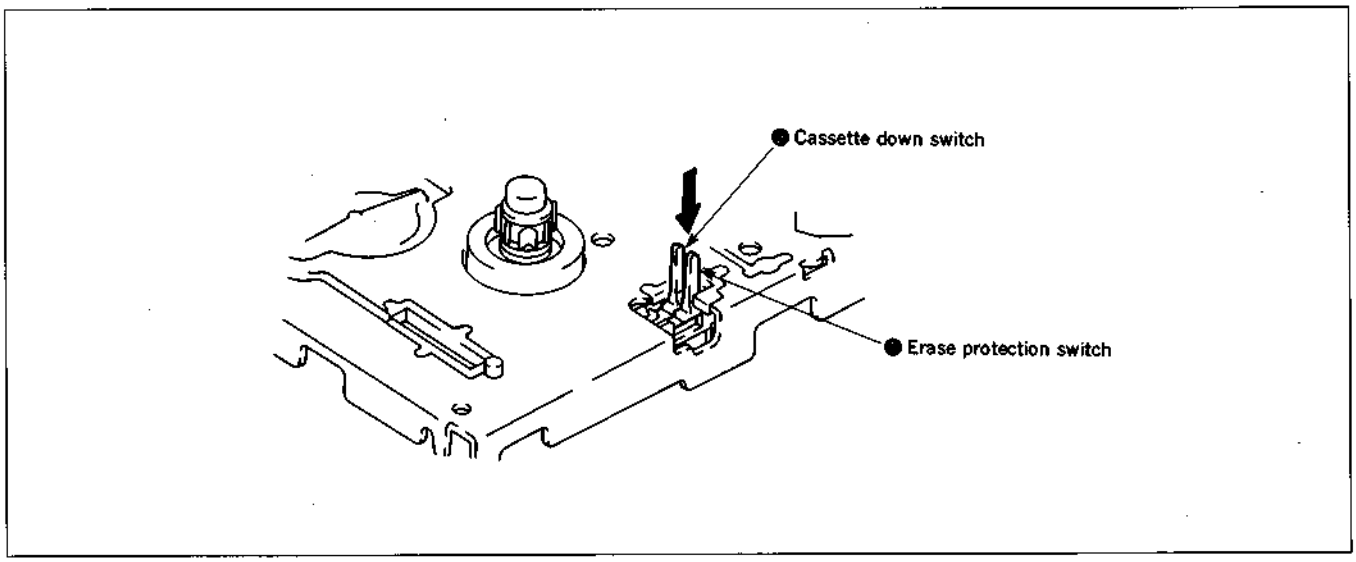


Fig. 7-1. How to complete tape threading with FL cassette compartment removed

7-1-2. How to Enter Playback Mode with FL Cassette Compartment Removed

Follow the procedure in Paragraph 7-1-1. to complete tape threading. Then, press the Playback button.

7-1-3. How to Enter Record Mode with FL Cassette Compartment Removed

1) Follow the procedure in Paragraph 7-1-1. to thread the tape. Push the erase protection switch ❶. (Fig. 7-1.)
2) Hold down the erase protection switch and press the Record button.

Note : Pressing the Record button without pushing down the erase protection switch ● will cause the tape to be unthreaded and ejected.

7-1-4. How to Load/Unload Tape Manually with Power OFF

1) Push down the insertion protection lever ❶ in the direction of the arrow.
2) Rotate the worm gear ❷ in the direction of the arrow ⓐ until tape loading is complete.
(To unload the tape, rotate the worm gear in the direction of the arrow ⓑ.)

Note : Do not move the cassette holder manually. This may result in phase misalignment.

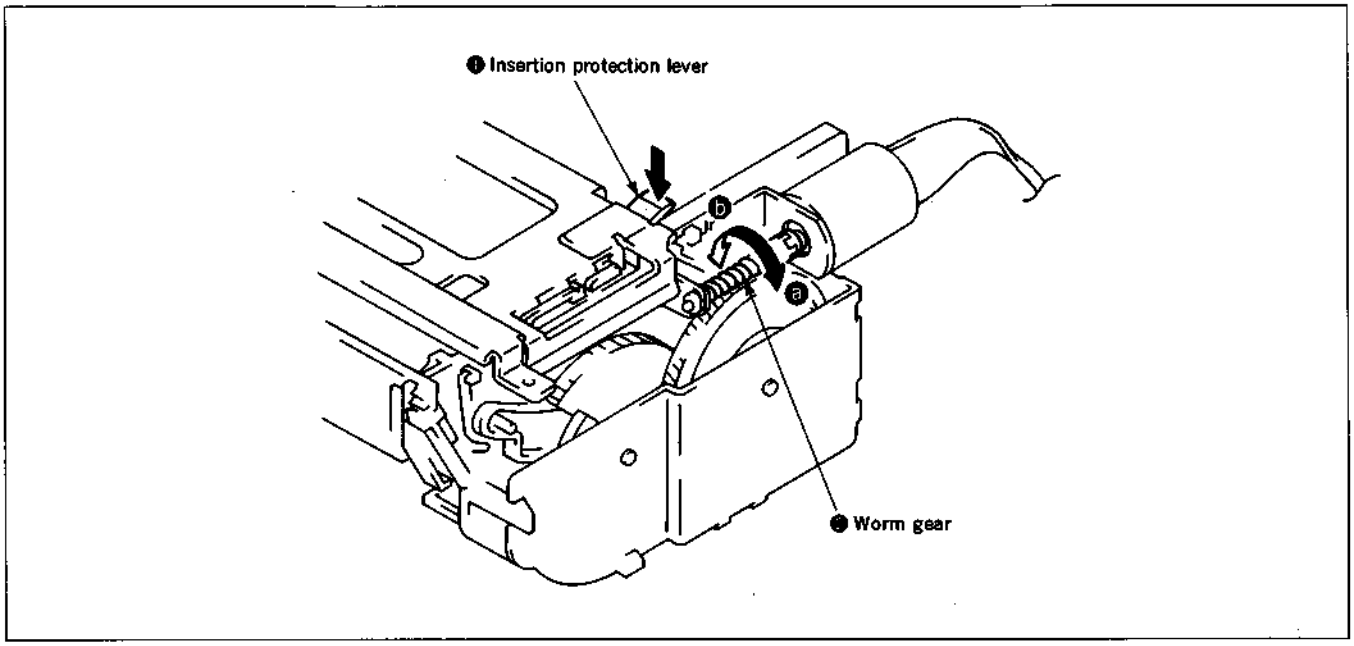


Fig. 7-2. How to load/unload tape manually

7-1-5. How to Thread/Unthread Tape with Power OFF (1)

1) With a DC regulated power supply, by applying a voltage of 7 to 10V across the power terminals of the L motor (see Fig. 7-3.), the tape can be threaded. (The red mark indicates the ⊕ side.)
(To unthread the tape, apply the same voltage with the polarity inverted.)

Note : Do not thread or unthread the tape with the set wrong side up.

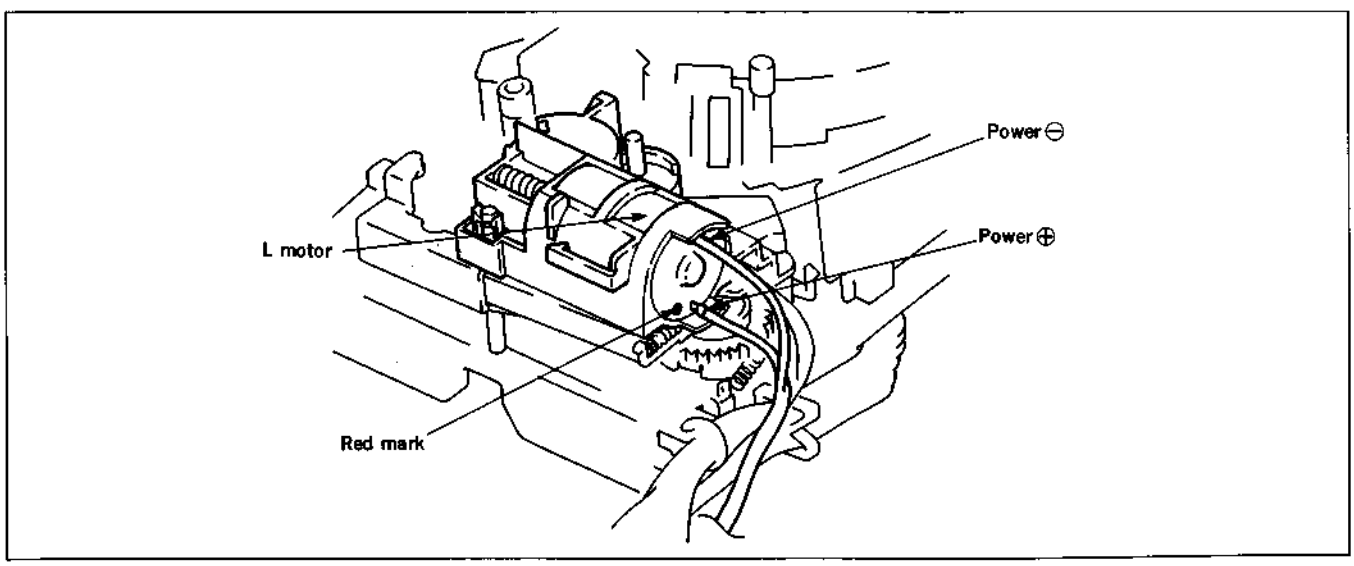


Fig. 7-3. How to thread/unthread tape manually (1)

7-1-6. How to Thread/Unthread Tape Manually with Power OFF (2)

1) Remove the two screws (PWH2.6×8).
2) Extend the claws and remove the L motor ass'y ❷ in the direction of the arrow. (Fig. 7-4.)
3) As shown in Fig. 7-5. rotate the S gear ❸ of the D gear ass'y in the direction of the arrow ⓐ until tape threading is complete (the S threading ring ❹ is locked by the lock arm ❶). Rotate the T slide gear ass'y ❺ in the direction of the arrow ⓑ until it is butted.
   (To unthread the tape, move the lock arm ❶ in the direction of the arrow ⓒ to unlock the S threading ring, then rotate the S gear in the direction of the arrow ⓓ. Move the T slide gear ass'y in the direction of the arrow ⓔ.)

Note : When installing the L motor ass'y, refer to Paragraph 7-3-13. Installation of L motor ass'y.

Note : Do not thread or unthread the tape with the set wrong side up.

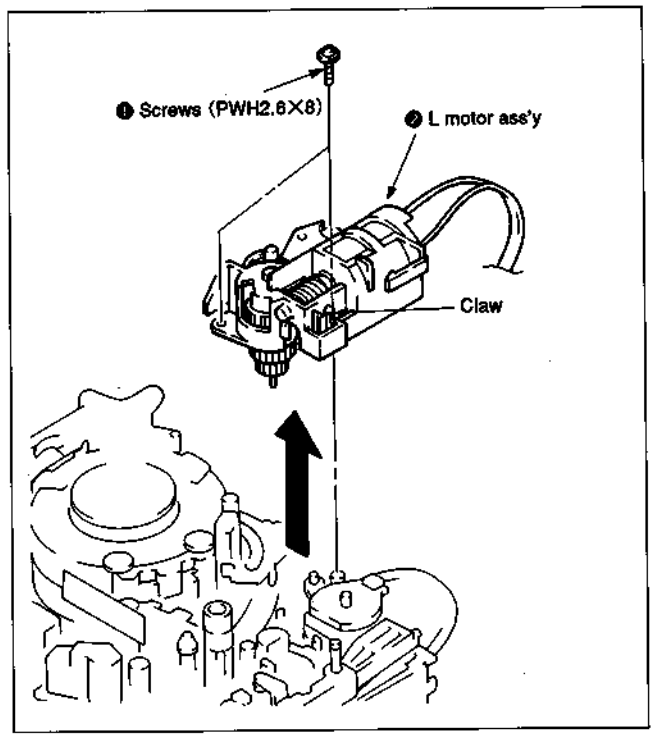


Fig. 7-4. How to thread/unthread tape manually (2)-a

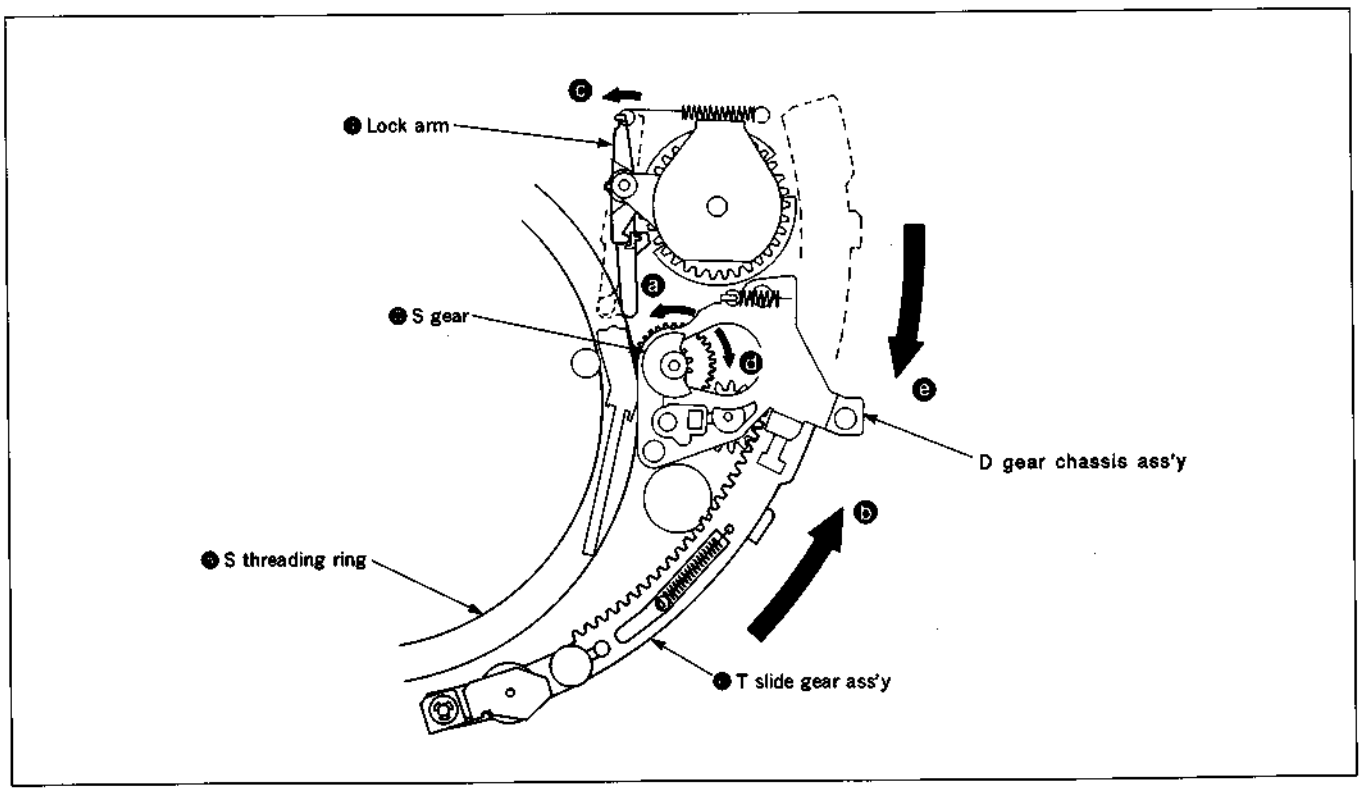


Fig. 7-5. How to thread/unthread tape manually (2)-b

7-2. PERIODIC INSPECTION AND REPLACEMENT

In order to assure satisfactory functions and performance of the set and the prolonged life of both the machine and tape, it is recommended to carry out the following periodic inspection and maintenance.

※After repairing the set, perform the following maintenance items regardless of how long the set has been served by the user.

7-2-1. Cleaning of Rotary Head Disk Ass'y

1) Prepare the deerskin (Jig Ref. No. J-7) moistened with the cleaning liquid (Jig Ref. No. J-5). Lightly press the deerskin to the rotary drum ass'y and slowly rotate the rotary head disk with fingers to clean the head. (NEVER use the power motor to rotate and clean the head.)
2) NEVER move the deerskin vertically to the head tip when cleaning the head. This incurs a very high hazard of damaging the head tip.

7-2-2. Cleaning of Tape Run System

1) Using the deerskin moistened with the cleaning liquid, clean the tape run surface (tape guide, drum ass'y surface, capstan, pinch roller, etc.).

7-2-3. Cleaning of Drive System

1) Using cloth moistened with the cleaning liquid, clean the drive unit.

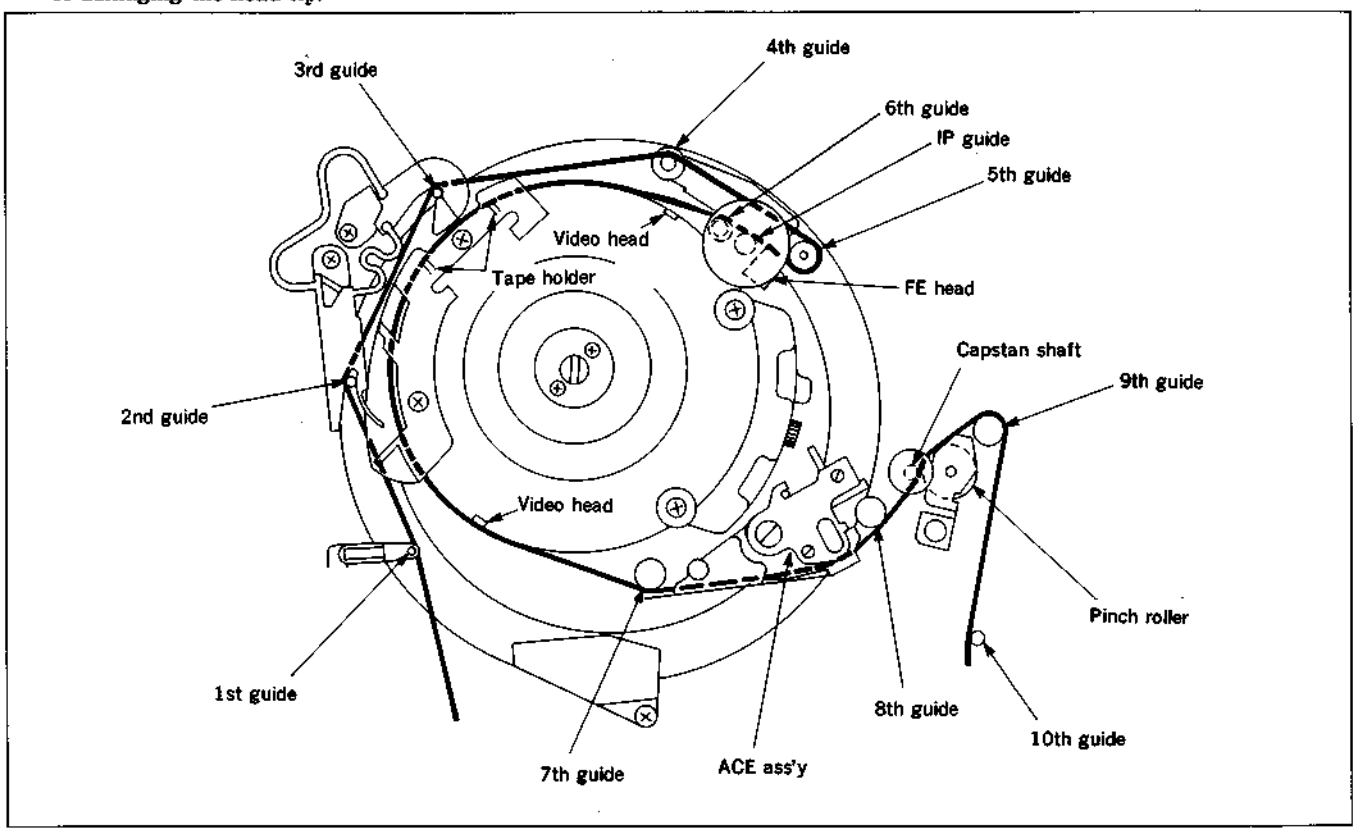


Fig. 7-6. Parts to be cleaned

7-2-4. Periodic Inspection Items

Perform the following inspection and maintenance items depending on how long the set has been served by the user.

	Maintenance and inspection items	Replacement part No.	Duration of service: 500	1,000	1,500	2,000	2,500	3,000	3,500	4,000	4,500	5,000	Remarks
Tape run system	Cleaning of tape run surface		○	○	○	○	○	○	○	○	○	○	In addition to the cleaning on the duration of service, always perform the item when repairing the set.
	Cleaning and degaussing of ACE ass'y		○	○	○	○	○	○	○	○	○	○	
	Cleaning and degaussing of video disk ass'y		○	○	○	○	○	○	○	○	○	○	The head life depends largely on the end-use and handling.
Performance checks	Abnormal sound		☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	Adjust or replace the part generating abnormal sound.
	Back tension measurement		—	☆	—	☆	—	☆	—	☆	—	☆	Check as per Para. 7-3-16. Specified value : 36 to 43g•cm (when measured with a torque cassette tape).
	Brake system check		—	☆	—	☆	—	☆	—	☆	—	☆	
	Checks on the recording and reproducing functions		☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	In addition to the check on the duration of service, always perform the item when repairing the set.
	Forward torque measurement		☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	Specified value : 40 to 80g•cm (SL-0003C)

○ Cleaning ☆ Check

Note : When overhauling the set, replace necessary parts on referring to the above items.

7-2-5. List of Service Jigs and Tools

Ref. No.	Designation	Part code	Jig mark	Usage and others
J-1	Torque measurement tape	J-6080-003-C	SL-0003C	Measurement of FWD torque and back tension
J-2	Parallel plate	J-6086-570-A	SL-0657	Audio/CTL head tilt adjustment capstan shaft vertical adjustment
J-3	Small mirror for adjustment (with handle) Small mirror for adjustment (mirror)	J-6080-029-A J-6080-030-1	SL-5052	Used for checking of the tape path and tape run adjustments
J-4	Alignment tape (KR5-1V)	8-969-995-92	—	Overall adjustment of tracking, picture quality and other characteristics
J-5	Cleaning liquid	Y-23031-001-0	—	
J-6	Clearance gauge	9-911-053-00	—	
J-7	Deerskin	2-034-697-00	—	Cleaning of parts
J-8	Head eraser	Commercial product	—	Degaussing of video and audio heads
J-9	Cleaning cassette tape	8-888-004-00	—	Cleaning of the video head
J-10	Angle split adjusting screw	J-6080-013-A	SL-0013	Angle split adjustment of video head
J-11	Video head checker	7-732-080-01	SL-5151	Video head check

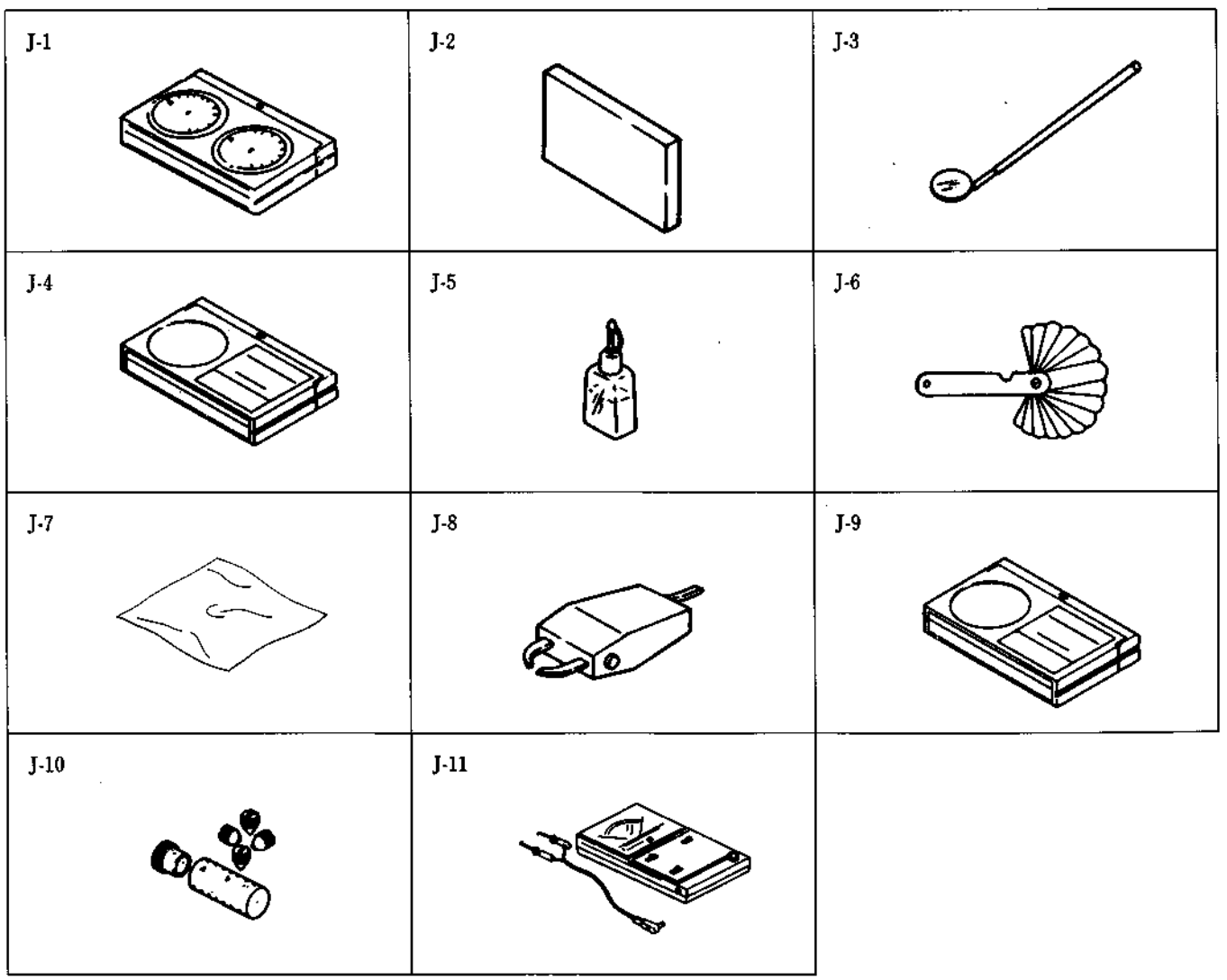


Fig. 7-7. List of service jigs and tools

7-3. CHECK, ADJUSTMENT, AND REPLACEMENT PROCEDURES

7-3-1. STATE OF WEAR OF VIDEO HEADS CHECK

As the accuracy of the check depends on the state of the heads and precision of the checker, the results should be taken only as an indication of the state of wear.

[Adjustment of video head checker]

1) Merchanical zero
   Verify that the pointer of the video head checker is at the mechanical zero position. If it is not at this position, adjust the mechanical zero control.
2) Battery voltage check
   Set the MODE switch to "BATT" and set the POWER switch to "ON". The deflection of the pointer should be within the range marked "BATT". If not, replace the battery (use a 6F22 battery) as follows.
3) Calibration check
   Set the POWER switch to "ON" and the MODE switch to "CAL", then adjust the CAL control so that the pointer is on the CAL mark.
   Note: 1) Be sure to carry out this adjustment whenever the RANGE switch is changed.
   2) Be sure to check CAL before measuring the head and proceed the measurement after adjusting CAL, if CAL is not properly set.

   For details on "Video head checker adjustments", refer to the Operation Manual for the video head checker (SL-5151).

[Method of measurement] (Fig. 7-8, 7-9)

1) Remove the two screws (P2×3) that hold the damper assembly in place, then remove the damper assembly.
2) Detach the lead wires on the 2 video heads.
3) Attach the measuring clips to the head leads.
   Be sure to separate the leads by at least 1.5 cm.
4) Set RANGE switch to "B" and MODE switch to "MEAS". The pointer will deflect to indicate the state of wear of the heads.
   Note: The deflection for the 2 video heads may be different, so be sure to measure both.

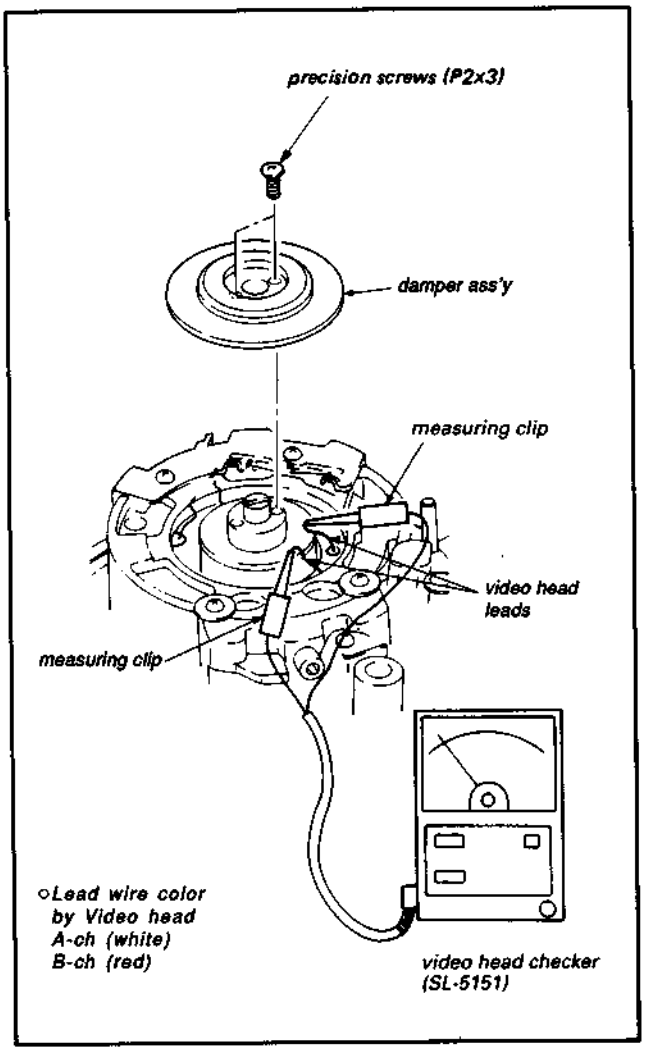


Fig. 7-8.

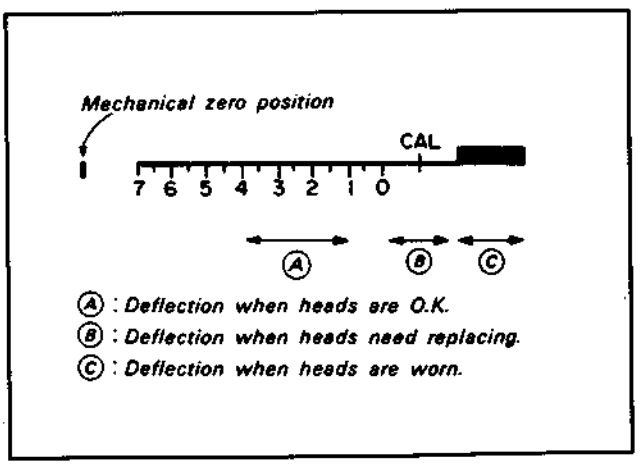


Fig. 7-9. Measured value

7-3-2. REMOVAL OF THE ROTARY HEAD DISK ASSEMBLY

1) Remove the two precision screws (P2×3) ❶, and remove the damper assembly ❷.
2) Remove the hexagonal socket bolt (3×8) ❸ with an allen wrench and remove the upper drum assembly ❹ according to the section 4) of "7-3-4. REPLACEMENT OF THE DRUM ASSEMBLY".
3) Unsolder ❻ the rotary head disk assembly ❺ relay board (red and white leads, 4 locations).
4) Remove the two hexagonal socket bolts (2.6×8) ❼ and the rotary head disk assembly ❺.

Note : Pay full attention not to touch the head tip by hand or damage it by striking.
In order to prevent from a damage at the head tip, move the head disk by 90° and remove/mount, as shown in the Fig.Ⓐ.

Note : When the rotary head disk assembly is engaged in and it is difficult to be removed, tighten the removed hexagonal socket bolts ❼ little by little into the screw holes moved by 90° from the original positions.
Head disk can be easily removed by raising it with two screws.

7-3-3. MOUNTING OF THE ROTARY HEAD DISK ASSEMBLY

1) Insert the rotary head disk ❺ in place, being careful of the direction so that the red and white leads are in the right place.

Note : Be careful not to damage the contact surface of the internal diameter by unreasonable insertion or slant insertion. Be sure to make straight insertion without giving any unreasonable force.
If head disk horizontally moves a little round the center of screw holes.

2) Insert the pin into the mounting hole, and tighten the hexagonal socket bolts ❼, then, solder the leads.

Note : After tightening, pull out the pin.
Under the state of pin being inserted, be careful not to turn the head disk.

3) Attach the upper drum, being careful (as during removal) not to move the adjusting plate.
While pressing the two points that determine the height, tighten hexagonal socket bolts ❸.

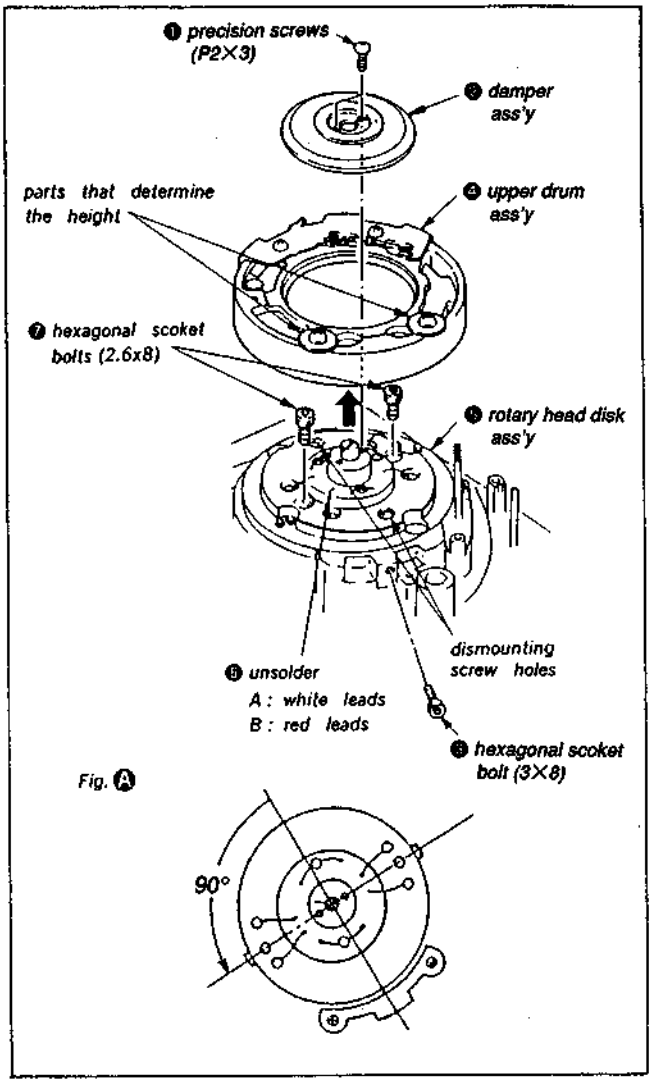


Fig. 7-10. Removal of the rotary head disk ass'y

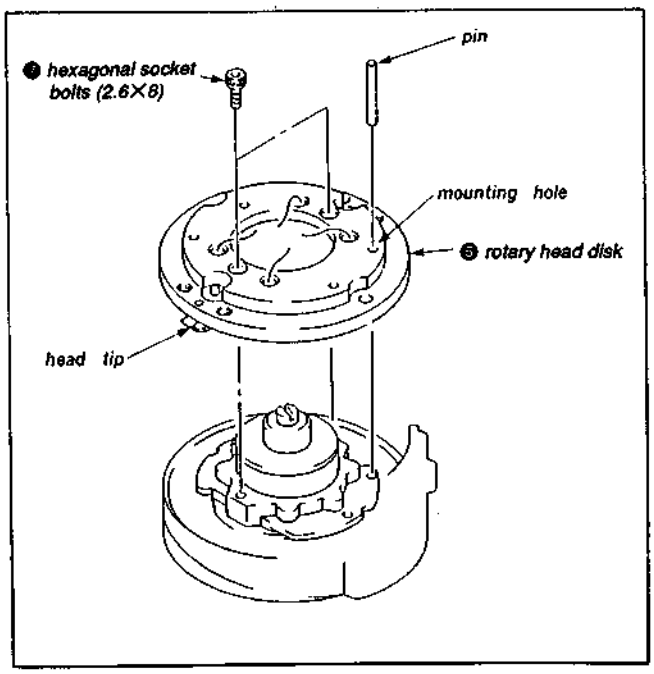


Fig. 7-11. Mounting of the rotary head disk ass'y

7-3-4. Replacement of Drum Ass'y

1) Remove the two connectors ❶ from the rear of the chassis.
2) Remove the roller wait ❷.
3) Remove the three drum mounting screws ❸ from the rear of the chassis.
4) Press the part ⓐ of the adjusting plate ❹ in the direction of the arrow and remove the drum ass'y ❺.

Note : Perform the tape path adjustments after replacing the drum ass'y.

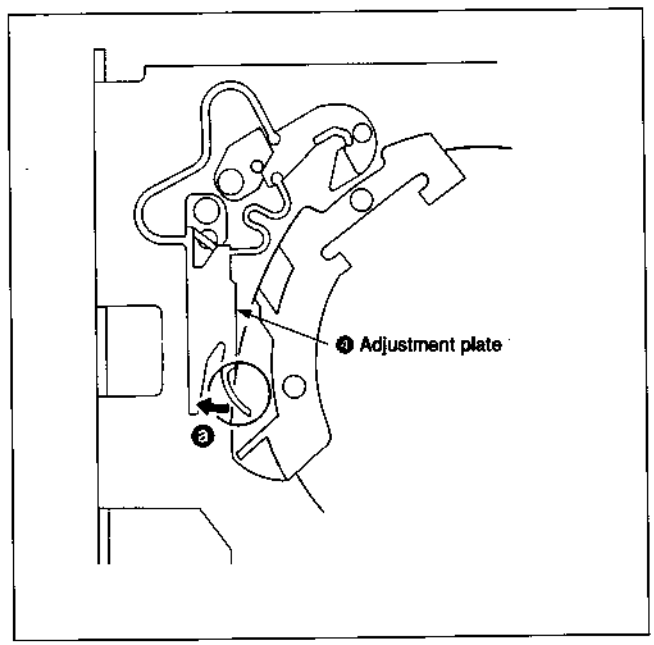


Fig. 7-12. How to remove the drum ass'y

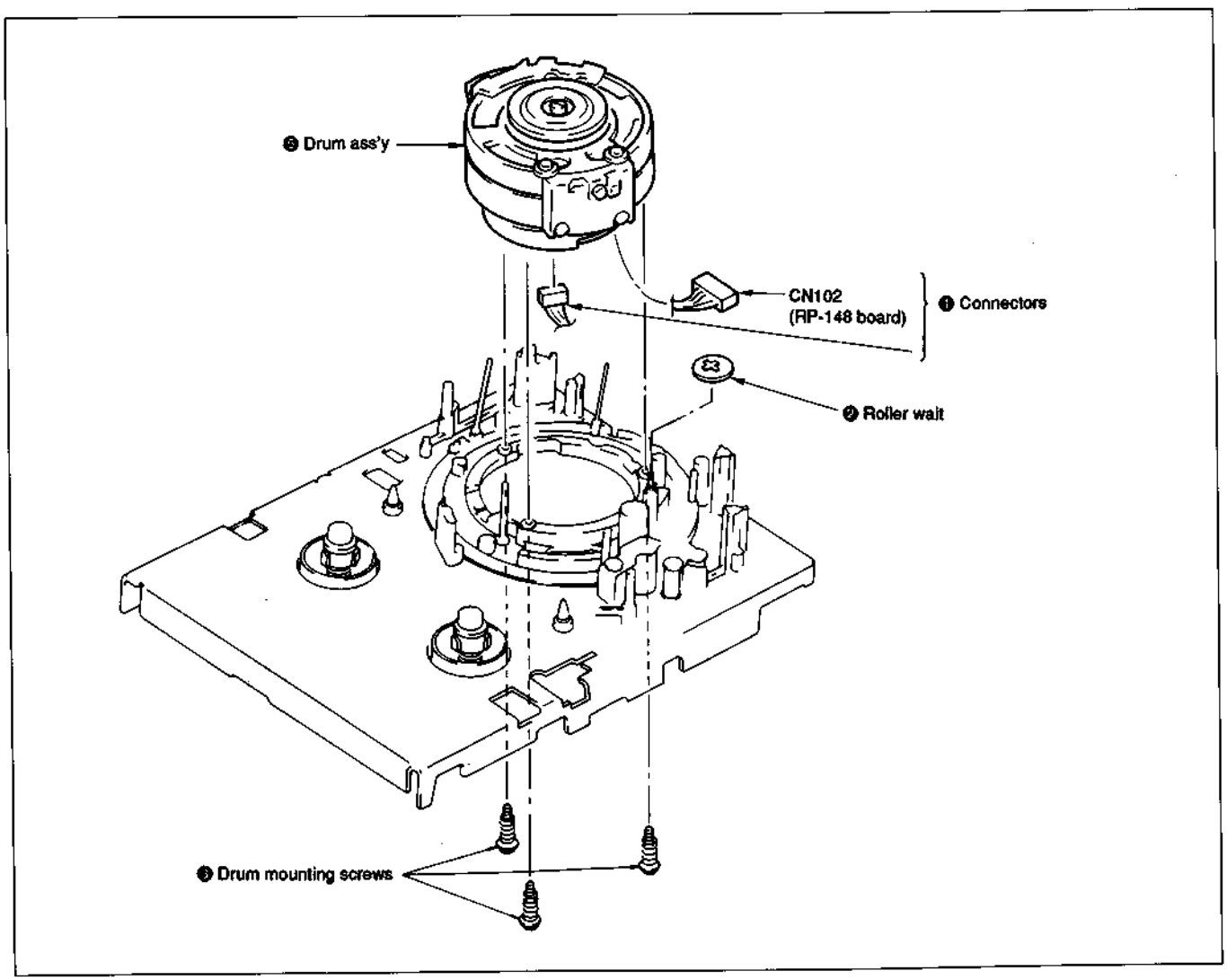


Fig. 7-13. How to remove the drum ass'y

7-3-5. Drum Motor Replacement and PG Phase Adjustment

7-3-5-1. How to remove the drum motor

1) Remove the nut (N4) and remove the rotor ❷.
2) Remove the three screws (+P M2×12) ❸ and remove the stator ❹.

7-3-5-2. PG phase adjustment

Note : Always make this adjustment when the motor is mounted.

1) Rotate the drum shaft ❶ and position so that the hole Ⓐ in the flange ❸ may be seen from the hole ❷ in the lower drum.

Note : Be sure to align with the hole Ⓐ since there are two holes in the flange.

2) Install the stator.
3) Align the holes in the rotor ❹ with a straight line between the center of the drum shaft ❶ and the hole Ⓐ in the flange.
   (Specification : ±3°)
4) After replacing the drum motor, check the RF switching position. If this specification is not met, perform Paragraph 8-3-1. Switching positioning.

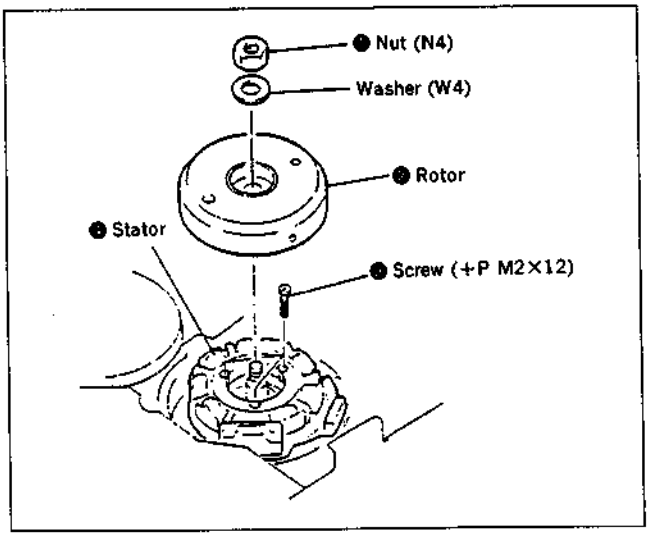


Fig. 7-14. How to remove the drum

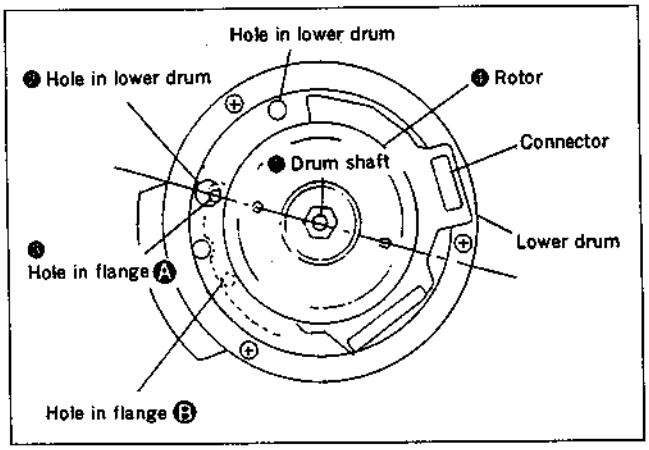


Fig. 7-15. PG phase adjustment

7-3-6. VIDEO HEAD DIHEDRAL CHECK AND ADJUSTMENT

This adjustment is generally unnecessary, but it is sometimes necessary when the video head disk is replaced. (The video head disk used for maintenance has been precision adjusted at the factory using a microscope and almost never needs to be readjusted.)

When judging whether the video, head dihedral angle is correct, the alignment tape is played back. When this is done the tracking center position.

If the check is done with other than the tracking center position (if the tracking is off-center), even if the dihedral angle is correct the picture will be reproduced as if it were off.

Before this adjustment is performed, the ACE assembly position adjustment (refer to the section where the tape path adjustment is described) must be completed.

[Method of checking]

Set to the tracking center position, play back the (βII) monoscope section of the alignment tape. Pay attention to portion Ⓐ or Ⓑ on broad line, if the width of the clearance, which appears by the vertical line under the switching line splitting in two, is narrower than the width of a line of the vertical one (even if some skew appears on it.), the adjustment is not necessary because dihedral angle is correct.

Perform this adjustment as shown below, when the clearance is wider than the width of a line of the vertical one.

[Method of adjustment]

1) As shown in Fig. 7-16. screw two dihedral angle adjustment screws (Jig Ref. No. J-10) into the adjustment screw holes on the side on which the red lead wires from the video head are connected, until the top of the screw is level with the video head disk. (If they are not screwed in far enough, the video head disk will not turn past the point where the top of the adjustment screw strikes the upper drum. Conversely, if it is screwed in too far, the head base will be moved, throwing the video head dihedral angle way off.)
   Note: The side on which the white lead wires are connected is the reference side and must not be moved.
2) Screw one of the two adjustment screws in a little bit farther until resistance is felt. Beyond this point, turning the screw still farther will move the video head, adjusting the dihedral angle.
3) With the adjustment screws in place, play the (βII) monoscope signal section of the alignment tape and see how the lines are reproduced. If the vertical lines are split apart more than before, turn the screw which was screwed in more tightly counterclockwise to loosen it, then adjust by tightening the other screw.
4) After the adjustment is completed, remove the adjustment screws and play the tape again to reconfirm that the adjustment is correct.

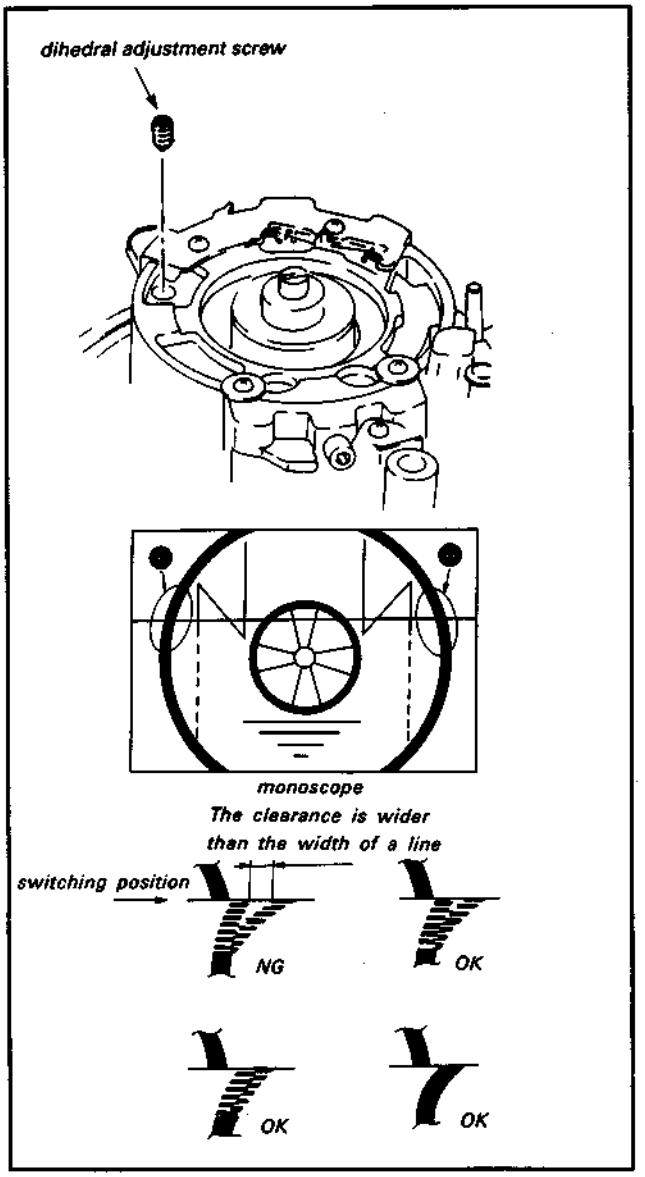


Fig. 7-16. Video head dihedral adjustment

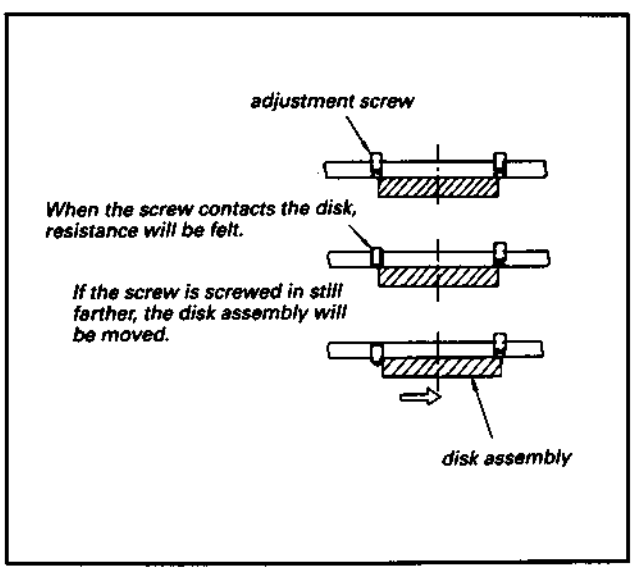


Fig. 7-17

7-3-7. How to Remove the Capstan Motor

1) Remove the screw (BVTP3×8) ❶ and remove the rotor hold (A) ❷.
2) Remove the two screws (P2×6) ❸ and the screw (BVTT2.6×5) ❹.
3) Remove the capstan motor ❺ from the rear of the chassis.
4) Remove the cover ❻ from the capstan motor ❺.

Note : Always perform the check described in Paragraph 7-3-8. when the capstan motor has been removed or replaced.

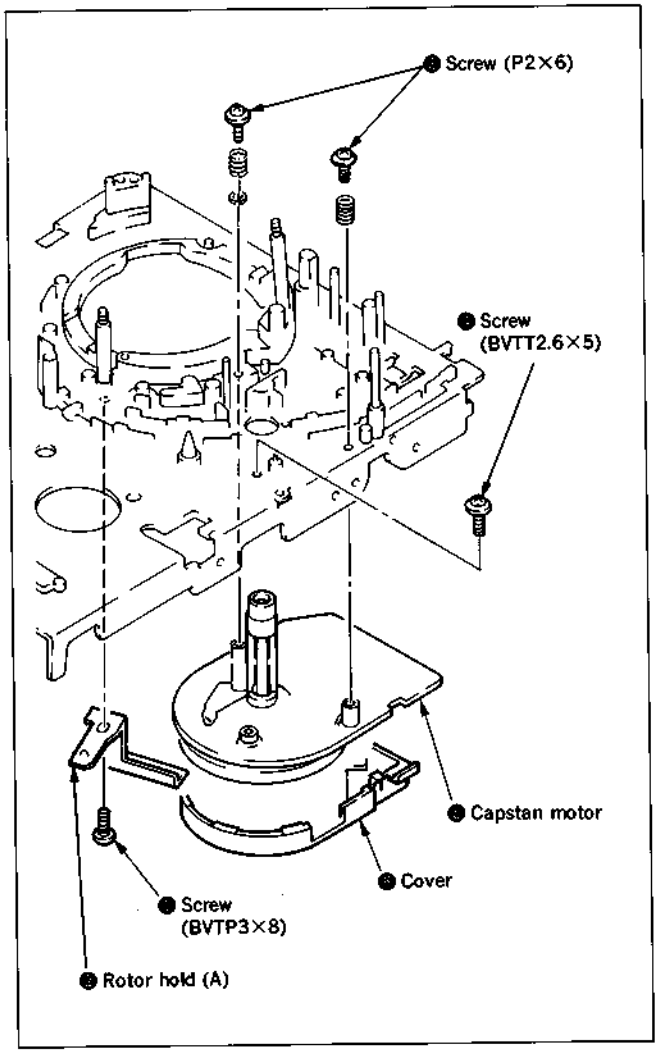


Fig. 7-18. How to remove the capstan motor

7-3-8. Capstan Shaft Perpendicular Adjustment

When the capstan motor has been replaced or removed, always perform the following adjustment.

1) Loosen the fixing screws Ⓑ and Ⓒ.
2) As shown in Fig. 7-19. put the parallel plate (Jig Ref No. J-2) on the capstan motor shaft and on the 8th guide sleeve perpendicularly.
3) Rotate the adjusting screw Ⓐ to set the capstan motor shaft perpendicularly.

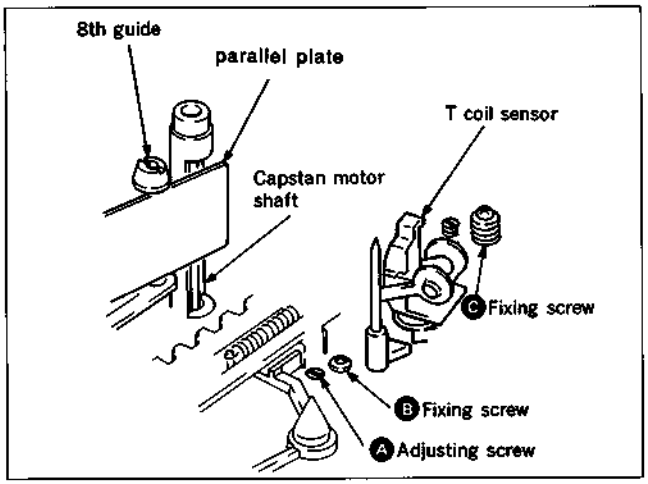


Fig. 7-19.

4) As shown in Fig. 7-20. put the parallel plate on the capstan motor shaft and on the 10th guide shaft perpendicularly.
5) Tighten the fixing screw Ⓒ and fix the capstan motor to ensure that the capstan motor shaft is perpendicular.
6) Put on the parallel plate again as shown in Fig. 7-19. and check the perpendicularity of the capstan motor shaft. If improper, repeat Steps from 3).
7) Tighten the fixing screw Ⓑ to fix the capstan motor.
8) Follow the paragraph describing the tape path adjustments to adjust.

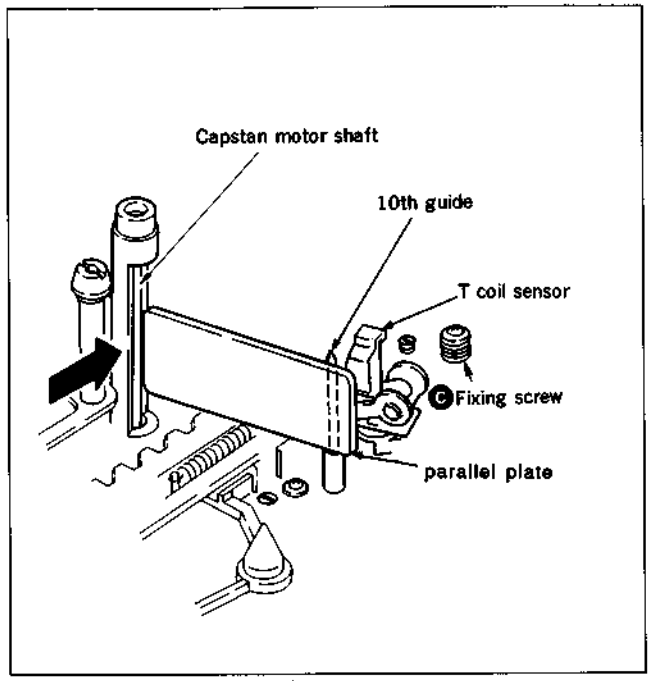
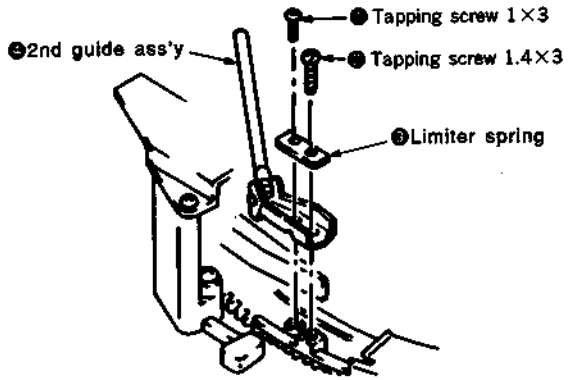


Fig. 7-20.

7-3-9. How to Remove the 2nd Guide

1) Remove the tapping screw (1×3) ❶.
2) Remove the tapping screw (1.4×3) ❷.
3) Remove the limiter spring ❸.
4) Remove the 2nd guide ass'y ❹.



〈How to install〉

1. Lightly tighten the tapping screw (1×3).
2. Fully tighten the tapping screw (1.4×3).
3. Adjust the tapping screw (1×3) until the height is 35mm. After adjustment, lock the tapping screw.

NOTE: The 2nd guide is put up fully.

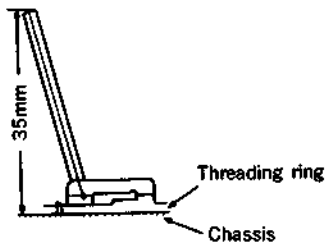
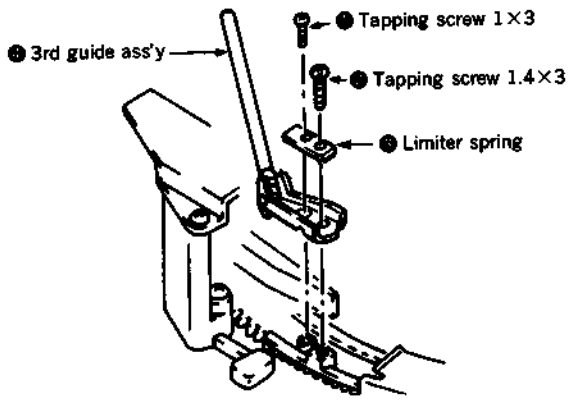


Fig. 7-21. How to remove the 2nd guide

7-3-10. How to Remove the 3rd Guide

1) Remove the tapping screw (1×3) ❶.
2) Remove the tapping screw (1.4×3) ❷.
3) Remove the limiter spring ❸.
4) Remove the 3rd guide ass'y ❹.



〈How to install〉

1. Lightly tighten the tapping screw (1×3).
2. Fully tighten the tapping screw (1.4×3).
3. Adjust the tapping screw (1×3) until the height is 35mm. After adjustment, lock the tapping screw.

NOTE: The 3rd guide is put up fully.

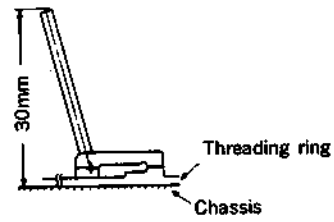


Fig. 7-22. How to remove the 3rd guide

7-3-11. Preparation for Removal of S Threading Ring

1) Remove the drum ass'y. (See Paragraph 7-3-4.)
2) Remove the two screws (PTT2.6×12) ❶ and remove the ACE ass'y ❷.
3) Remove the screw (PWH2.6×8) ❸ and remove the guide plate ❹.
4) Remove the two screws (PWH2.6×8) ❻ and undo the two claws ❼.
5) Remove the L motor ass'y ❽.

Note: When installing the L motor ass'y, refer to "Paragraph 7-3-13. Installation of L motor ass'y."

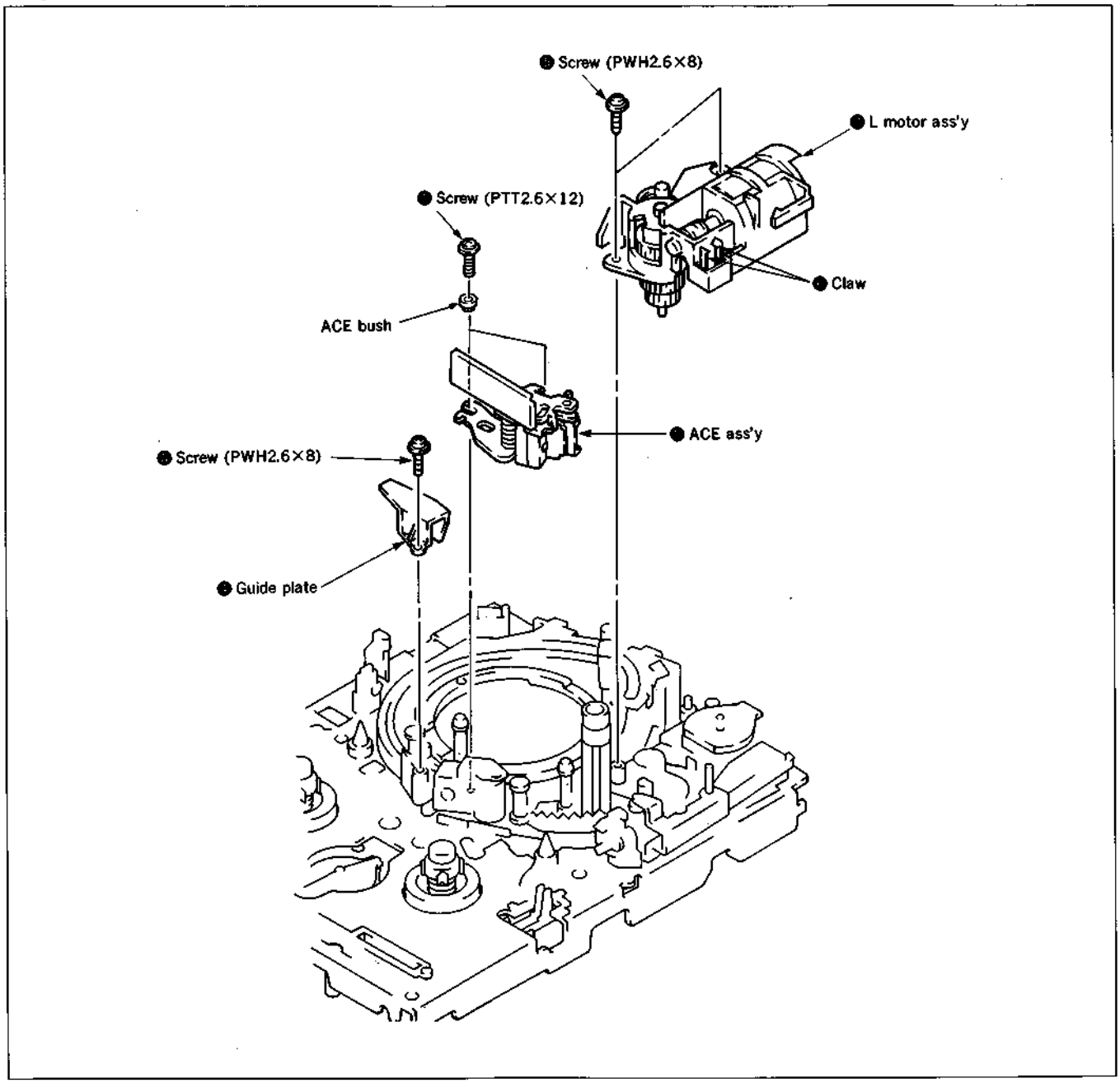


Fig. 7-23. Preparation for removal of S threading ring (1)

6) Remove the screw (PWH2.6×8) ⑧ and the screw (2.6×25) ⑨ and remove the shuttle guide (2-Y) ⑩.
7) Remove the three screws (PWH2.6×8) ⑧ and the screw (2.6×25) ⑨ and remove the shuttle guide (1-Y) ⑪.
8) Remove the 6th guide nut ⑫, 6th guide flange ⑬ and 6th guide sleeve ⑭.
9) Remove the cross-recessed, stepped long screw ⑮ and remove the thrust base ass'y ⑯.
10) Remove the pin link liner plate ⑰.

Note : After removing the guide plate, do not thread or unthread the tape with the shuttle guides mounted.

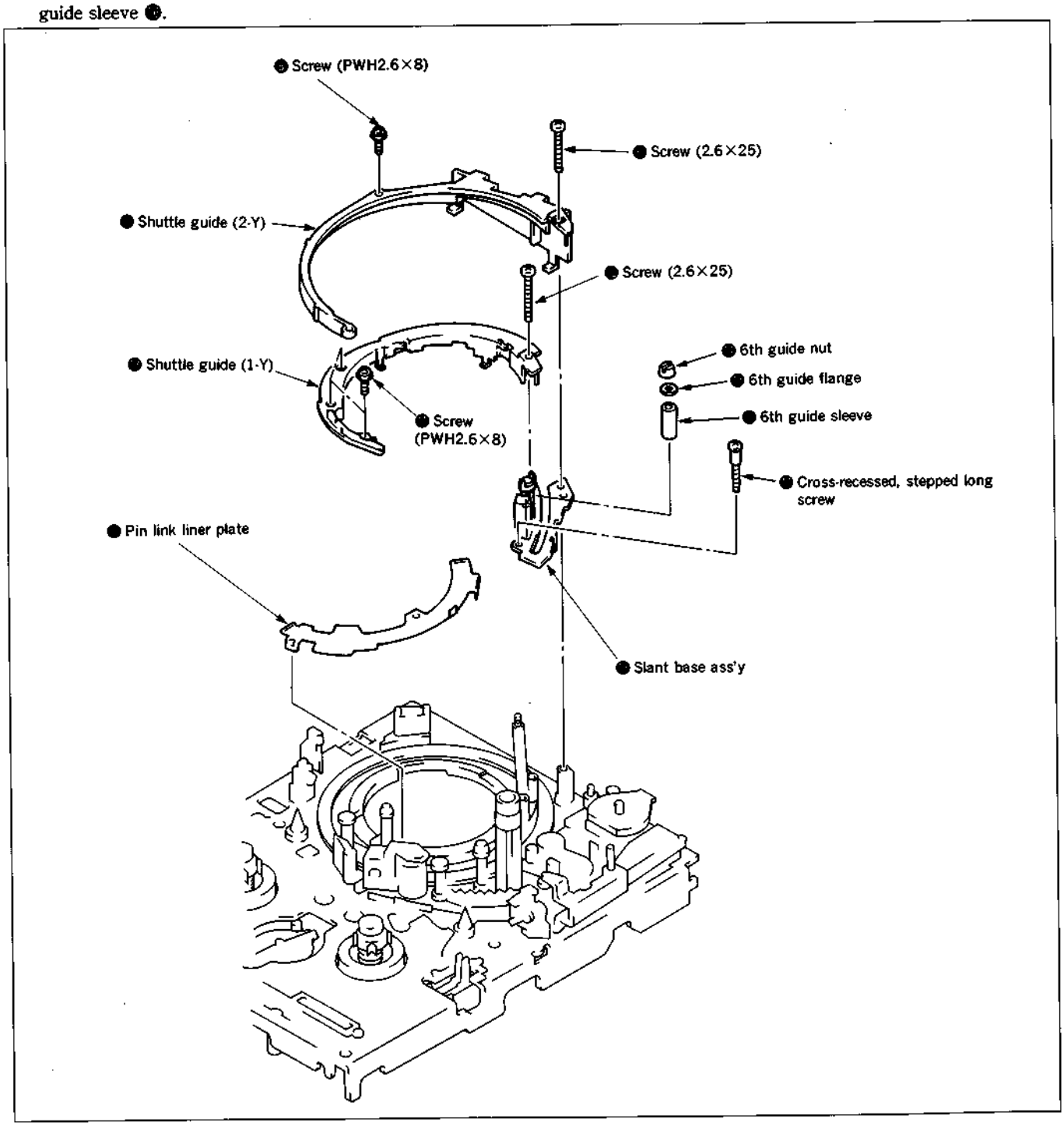


Fig. 7-24. Preparation for removal of S threading ring (2)

7-3-12. How to Remove the S Threading Ring

1) Remove the two thread washers ❶ and the two ring rollers ❷.
2) Remove the S threading ring ❸.

Note : Do not use the stop washer that was removed.
After replacing and installing the S threading ring, follow the tape path adjustment procedures to adjust the ACE ass'y.

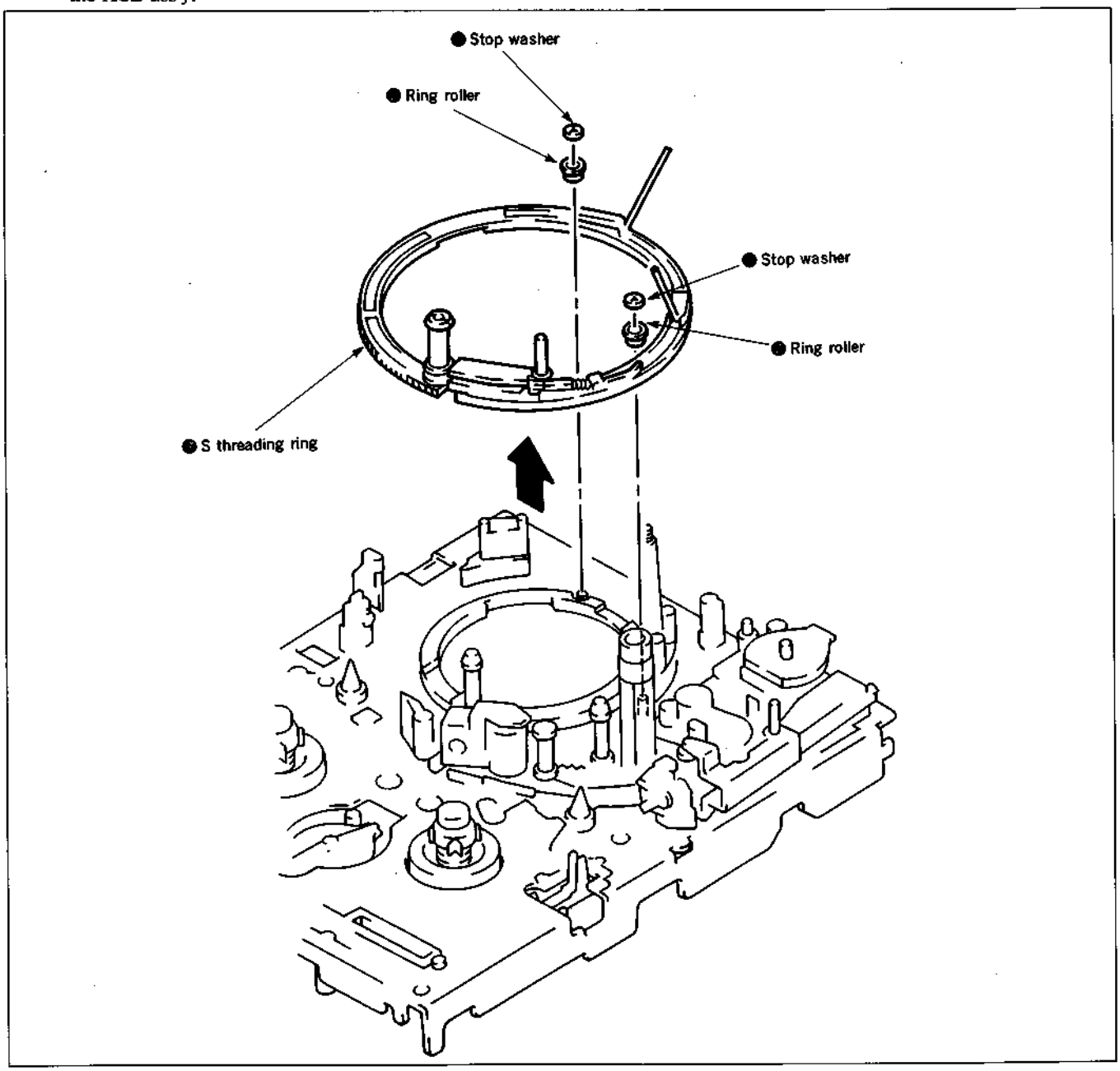


Fig. 7-25. How to remove the S threading ring

7-3-13. Installation of L Motor Ass'y

Install the L motor ass'y while pressing the T slider gear ass'y ❷ in the direction of the arrow ⓑ so that the center of the hole ❸ in the S threading ring ❶ is aligned with the hole in the mechanical chassis.

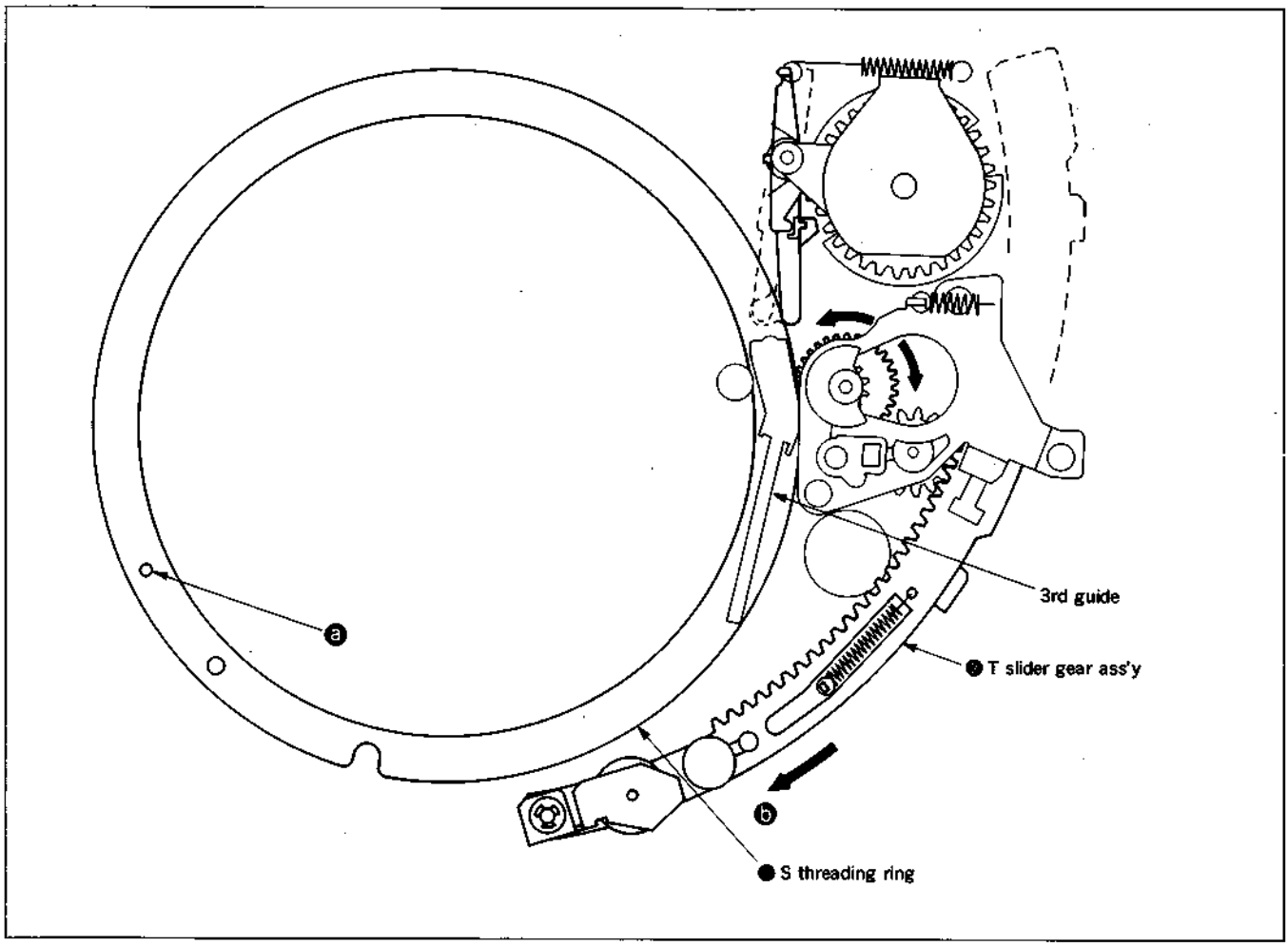


Fig. 7-26. Installation of L motor ass'y

7-3-14. Tension Regulation Lever Positioning

1) Enter the Playback mode. (See Paragraph 7-1-2.)
2) As shown in Fig. 7-27. verify that the tape guide pin ❶ of the tension regulation lever ass'y is positioned in between the shuttle guide (2-Y) ❷ and the shuttle guide (1-Y) ❸.
3) If not positioned so, loosen the adjusting screw ❹ and move the tension regulation band ass'y ❺ in the direction of the arrow Ⓐ for positioning.
4) Repeat Steps 2) and 3).

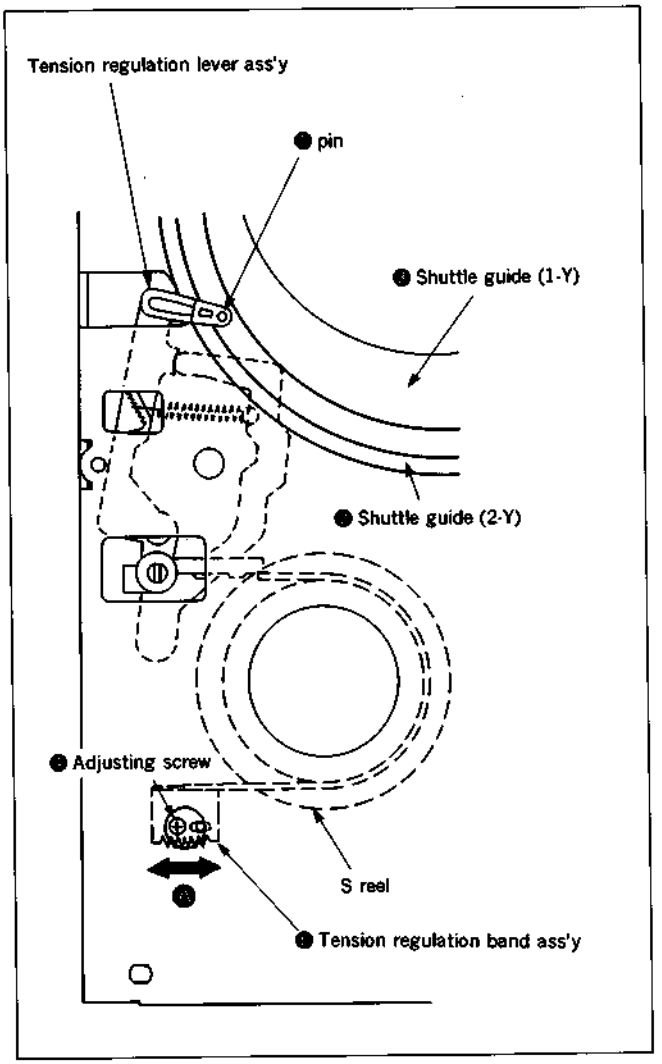


Fig. 7-27. Tension regulation lever positioning

7-3-15. Forward/Back Tension Ajustment

[Measurement Procedure]

1) Use the torque cassette (SL-0003C) and enter the Playback mode.
2) After the pointer of the meter on the S reel side practically circulates, read the indicated value.
   Specified value : 36 to 43g•cm

Note 1 : The set should be kept horizontally during measurement.

Note 2 : After measurement, pressing the STOP button may cause the tape to be loose. In this case, activate the Rapid Forward mode once to eliminate the tape looseness. Then, remove the tape.

[Adjustment Procedure]

Move the tention coil spring retained by the tension regulation lever in the direction of the arrow Ⓐ until the measured value falls into the specified range.

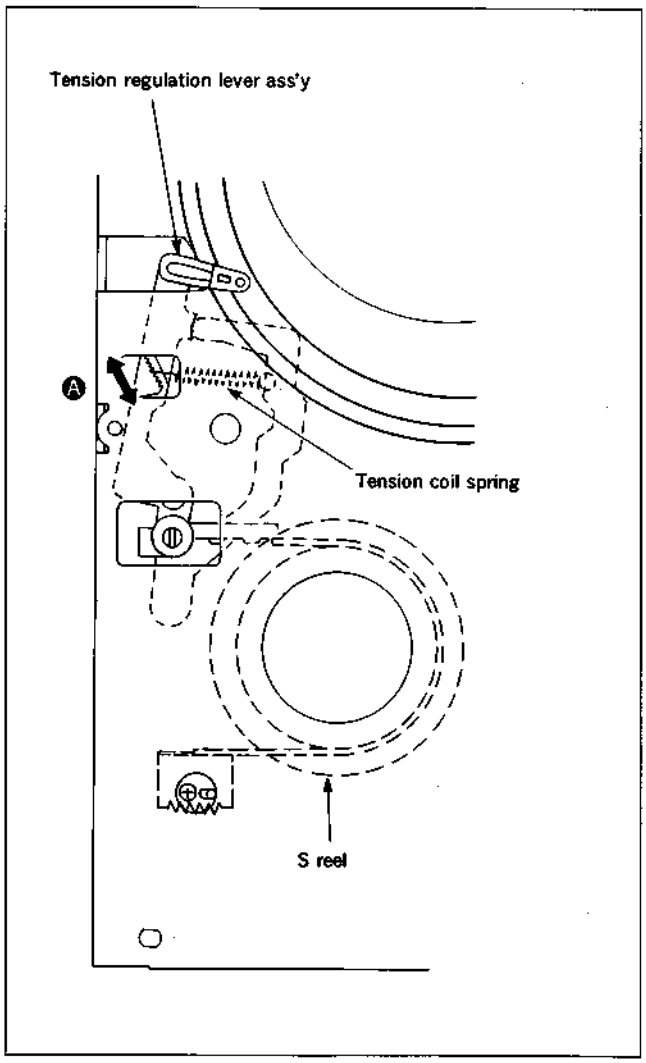


Fig. 7-28. Back tension adjustment

7-3-16. Forward Torque Check

[Measurement Procedure]

1) Insert the torque cassette (SL-003C) and record TV broadcast in the β II mode.
2) After the pointer practically circulates, read the indicated value of the meter on the T reel side. The specified value is 40 to 80g•cm.
3) If outside the specification, replace the T reel stand ass'y with a new part.

7-3-17. Gear Positioning of FL Cassette Control Ass'y

The cassette holder must be always moved in parallel to the mechanical chassis in the FL cassette control ass'y. The movement distance of this cassette holder is controlled by the gear device. If the engagement of the gears is off, the cassette cannot be moved properly unless the gears are adjusted so as to be engaged in the normal positions.

1) Prepare the positioning rod ❶ of 1.5mm thick and 200mm long.
2) Install the right drive arm ❷ to the right side plate and pass the positioning rod through them. Perform the same procedure for the left side plate and the left side drive arm.
3) Install the (right) intermediate gear ❸ (on which the intermediate gear shaft is put) to the right side plate. Pass the positioning rod through them. Perform the same procedure for the left intermediate gear.
4) In the same manner, install the drive gear ❹ and the worm wheel ❺ to the right side plate.

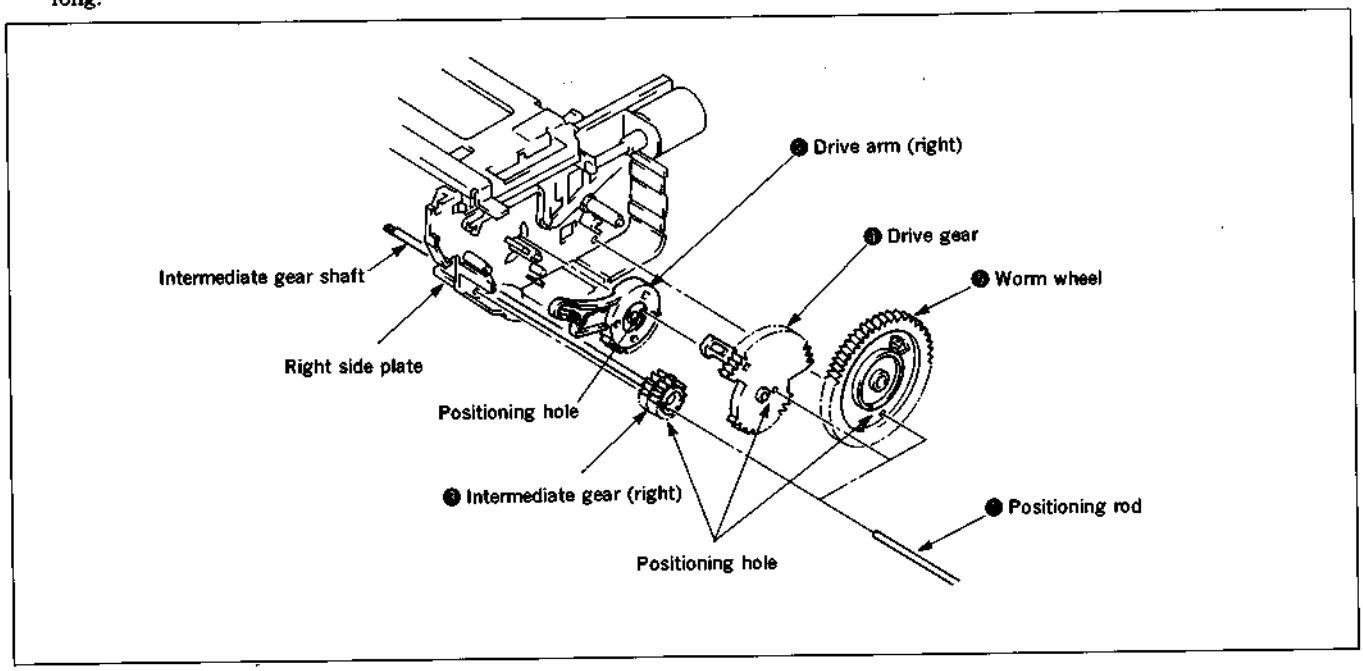


Fig. 7-29. Gear positioning

7-3-18. Cassette Door Ass'y Check and Adjustment

[Checking Procedure]

Place the door opening/closing arm back in the direction of the arrow Ⓐ fully. Verify that the upper door and the lower door are perpendicular.

[Adjustment Procedure]

Verify that the door opening/closing arm is put back fully. Close the upper door in the direction of the arrow Ⓑ to allow the upper door to be perpendicular and engage with the gear.

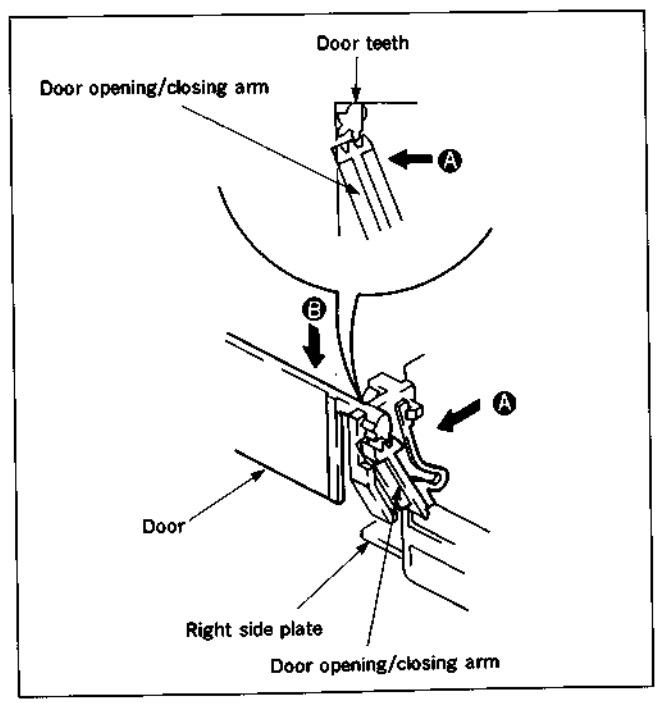


Fig. 7-30. Cassette door ass'y positioning

7-4. TAPE PATH ADJUSTMENTS

These adjustments affect strongly picture quality in each mode and tape compatibility. Therefore, these adjustments should be made carefully.

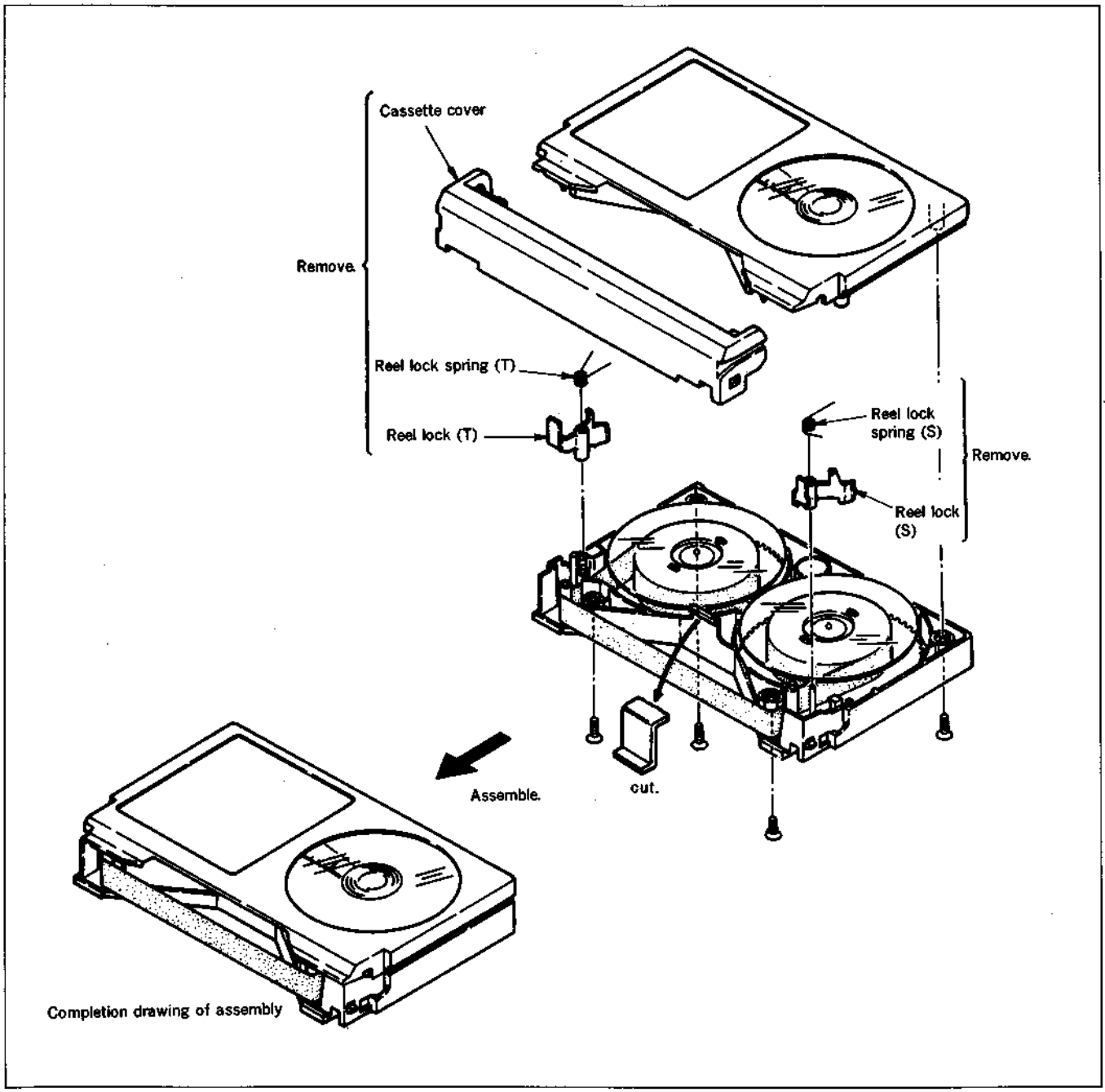


Fig. 7-31.

7-4-1. Preparation for Adjustments

1) Remove the alignment tape cassette cover as shown in Fig. 7-31.
2) Using the deerskin moistened with methanol, clean the tape run surface (tape guide, drum tape run surface, capstan shaft, pinch roller, ACE-FE head surface).
3) Connect an oscilloscope to the following:
   Channel 1 : CN104 ③ Pin (RP-148 board)
   External trigger : CN104 ① Pin (RP-148 board)
4) Reproduce the tracking portion 1kHz of the alignment tape.
5) Observe the oscilloscope and verify that the RF output waveform is flat and that the amplitude is the largest. (Pressing the tracking button ▼/▲ will increase/decrease the amplitude with the output waveform being flat.) Check whether the variation and contact values of the RF output waveform meet the specification shown in Fig. 7-32. when the waveform has its peak. If not met, perform Step 6).
6) If the waveform on the entrance side cannot be made flat as shown in Fig. 7-33. (a) by pressing the tracking button, practice "Tracking adjustment on the entrance side" described in Paragraph 7-4-2.
   If the waveform on the exit side cannot be made flat as shown in Fig. 7-33. (b) by pressing the tracking button, practice "Tracking adjustment on the exit side" described in Paragraph 7-4-3.

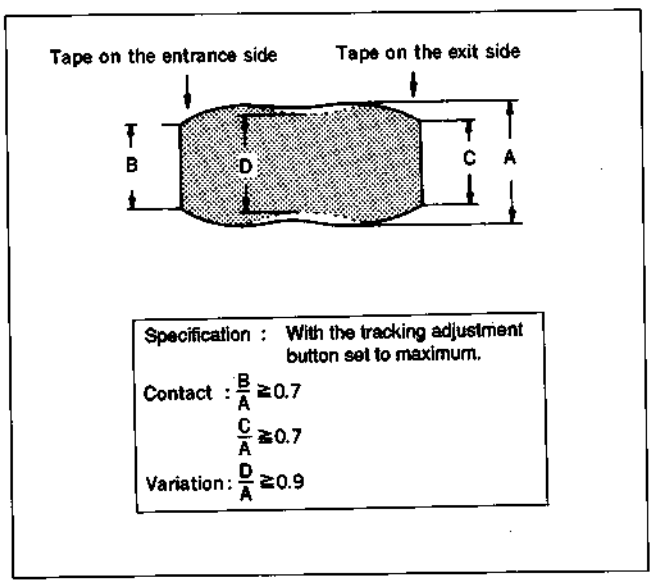


Fig. 7-32.

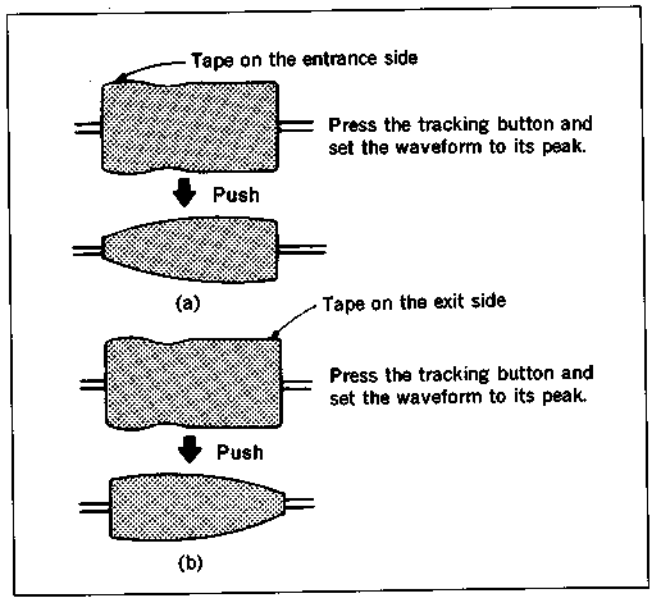


Fig. 7-33.

7-4-2. Tracking Adjustment on the Entrance Side

Fig. 7-36 shows the individual tape feeds and adjustment positions when practicing the tracking adjustment on the entrance side.

1) Undo the two claws ❷ and remove the roller wait ❶.

Note : After the tracking adjustment on the entrance side is all completed, install the roller wait ❶ and re-check the RF waveform.

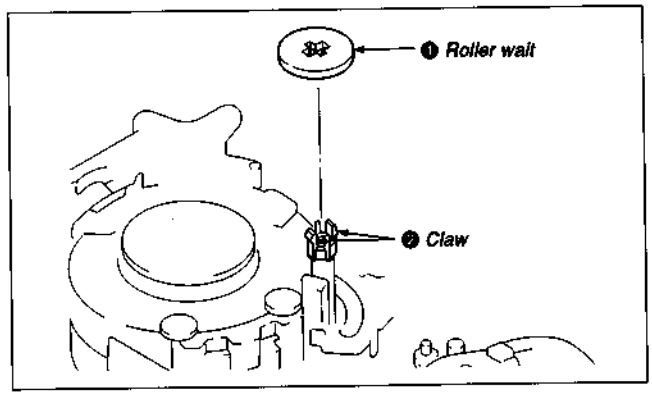


Fig. 7-34.

2) Turn the 6th guide counterclockwise and allow the tape to run freely into the drum.
3) Press the tracking button and adjust so that the amplitude of the waveform is about 60% of the peak.
4) Loosen the 5th guide fixing screw ❶. Turn the 5th guide until the waveform on the entrance side presents small projection form flatness as Fig. 4-35. Then, tighten the 5th guide fixing screw ❶ (Figs. 7-36. and -37.).

Note : After tightening the 5th guide fixing scerw ❶, verify that the waveform is as Fig. 4-35.

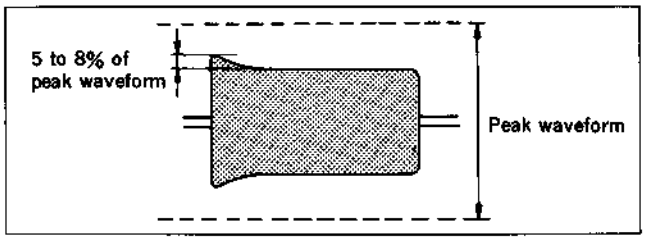


Fig. 7-35.

4) Lower the 6th guide to make the waveform flat.
5) Push down the tape between the 4th and 5th guides with a finger to lower the RF waveform on the entrance side. Verify that the waveform returns to the previous state when the finger is released.
6) In this state, check the 5th guide for any lift and curl. If any lift or curl is found, adjust according to the following procedures.

Note: The tape tension between the 3th, 4th and 5th guides must be balanced. If it is unbalanced, adjust the tilt of the 3th and 5th guides.

If the waveform is not allowed to be as depicted in Fig. 7-35. or if it takes a significant time for the waveform to return to the original state when the tape is pushed down and released on the entrance side, adjust according to the following procedures.

[Entrance Output of Waveform Won't Rise]

1) Check whether the vertical tensile force acts evenly to the 3rd, 4th and 5th guides. If not even, adjust the tilt of the 3rd and 5th guides.

   Note: Check the lower flange of the 4th guide for no lift.
2) Raise the lower flange of the 4th guide to increase the entrance output.

   Note: It is recommended to raise the lower flange of the 4th guide 0.4mm away from its bottom position (within a turning angle of 360°).
3) If the output waveform is not allowed to rise by Step 2), turn the tilt adjusting screw for the 5th guide a little counterclockwise to increase the entrance output.

[Entrance Output of Waveform Won't Drop]

1) Move the adjusting plate on the 3th guide side away from the drum. Tighten the screw ❷ at a position just before the tape tension on the lower side is eliminated.
2) If the tape is contact with the lower flange of the 4th guide, lower the flange. If the tape is away from the lower flange, adjust the tilt of the 5th guide so that the tape is not away from the lower flange.

[Lift is Present On 5th Guide]

Turn the 4th guide counterclockwise to feed the tape upward and remove the lift on the 5th guide.

Note: Check under the 4th guide for any significant curl.

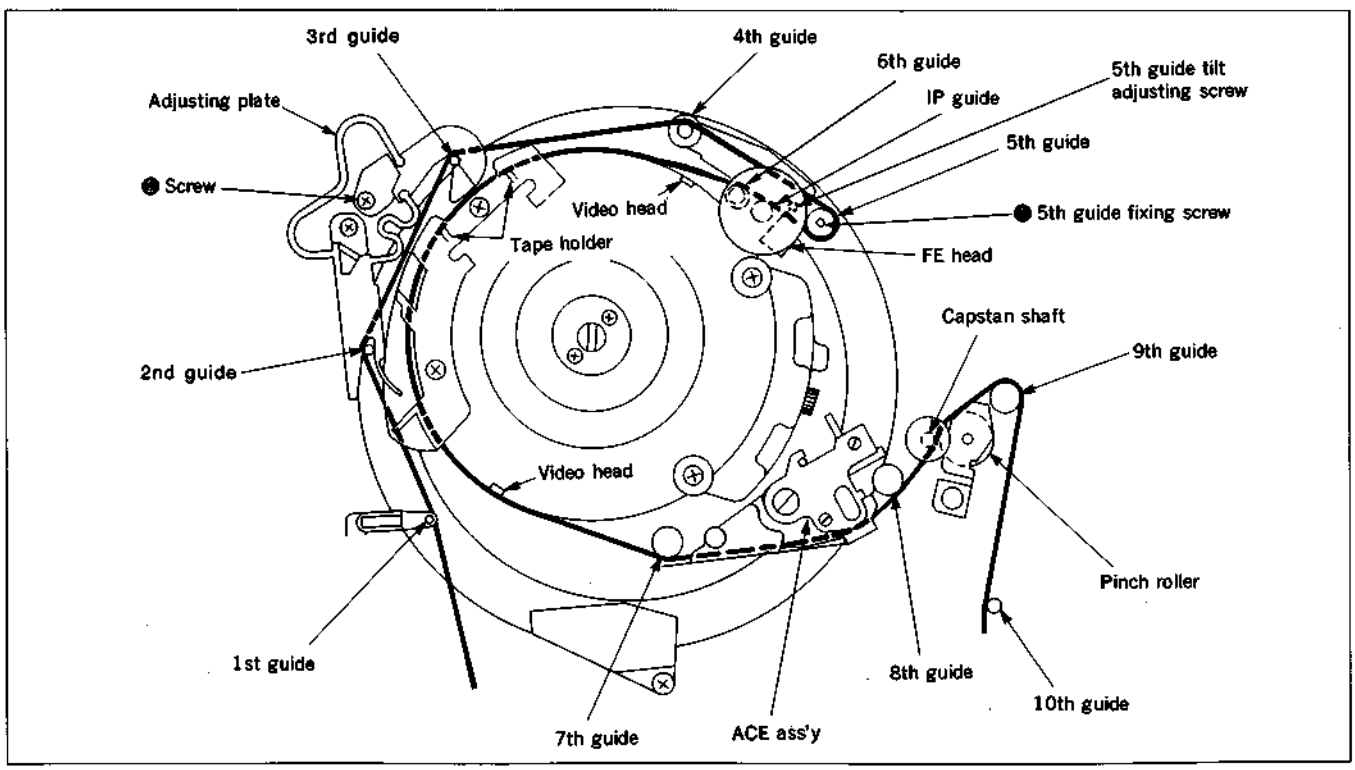
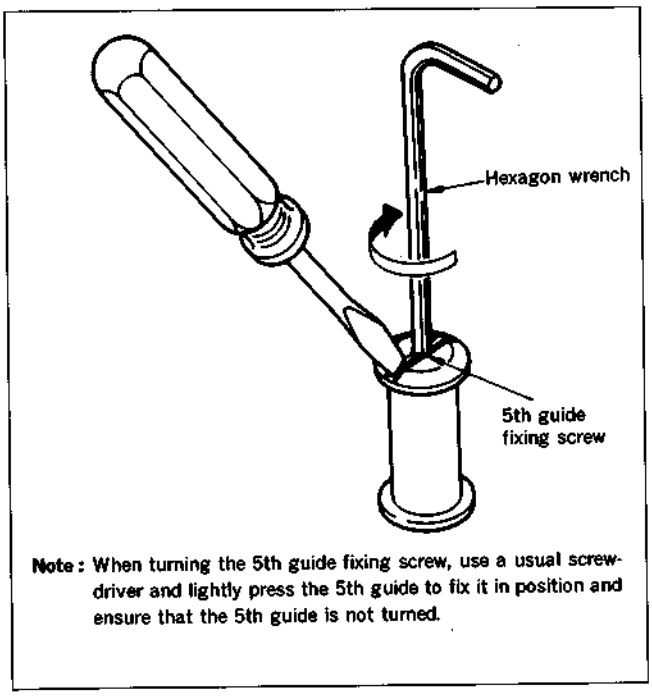


Fig. 7-36. Locations of tape guides

[Curl Is Present]

1) When a lift is present under the 4th guide:
   Separate the adjusting plate on the 3th guide side from the drum by a distance just before the tape tension on the lower side is loose.
2) When no lift is present under the 4th guide (a curl is present under the 4th guide):
   (1) Check whether the 4th guide is excessively raised. If excessively raised, turn the adjusting plate counterclockwise to lower the 4th guide.
   (2) If the curl is not allowed to be eliminated by Step 1), tighten the tilt adjusting screw for the 5th guide until the curl is eliminated.



Note: When turning the 5th guide fixing screw, use a usual screwdriver and lightly press the 5th guide to fix it in position and ensure that the 5th guide is not turned.

Fig. 7-37

7-4-3. Tracking Adjustment on the Exit Side

1) Connect an oscilloscope to the pin ③ of the connector CN104 (on RP-148 board). Connect its external trigger to the pin ① of CN104
2) Reproduce the tracking portion of the alignment tape. Press the tracking button and adjust to reduce the amplitude of the RF output waveform to 60% of the peak.
3) Raise the 7th and 8th guides (by turning the respective guide nuts counterclockwise) and observe the RF output waveform when the tape is allowed to run freely. (This waveform is called exit free waveform.)
   Note: Take care not to raise the guide excessively. Raise the guide by 0.2 to 0.3mm Do not allow the tape to come contact with the lower flange of the ACE head. (Fig. 7-38.)

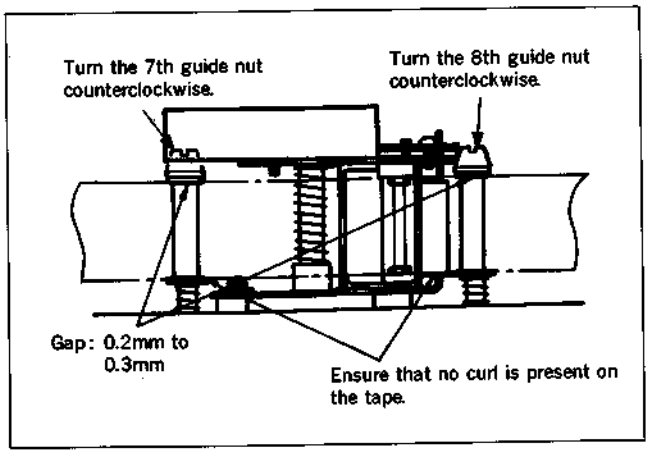


Fig. 7-38.

4) Verify that the exit free waveform is within the range specified by the graphs (a) and (b) in Fig. 7-39.
   - If outside the range, adjust according to the procedure described in Paragraph 7-4-5.

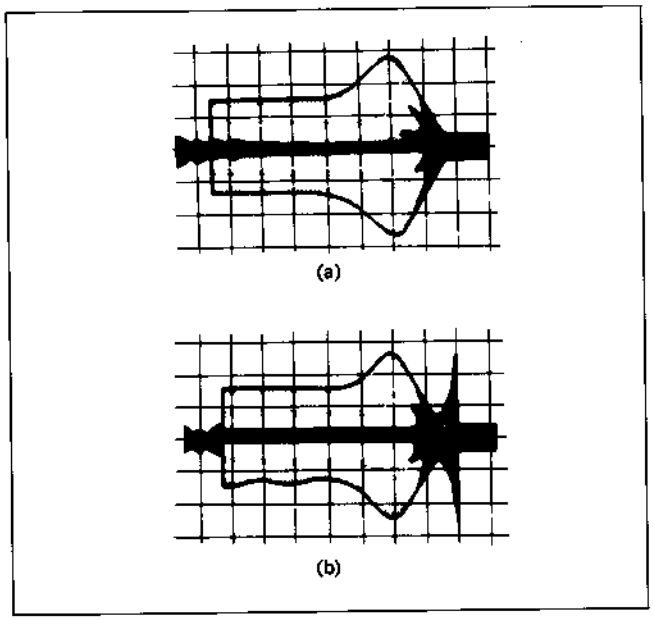


Fig. 7-39.

5) Turn the 7th guide nut clockwise and make the waveform flat. Turn the 8th guide nut clockwise and make the 8th guide contact with the tape. (Lower the guide to a position just before the waveform changes and the curl is eliminated.
   At this stage, the output waveform may be a little lifted. In such case, lower the 7th guide again to make the waveform flat. And make the 8th guide contact with the tape.
6) Run the Forward mode and ensure that no curl is present on the 7th and 8th guides.
7) Run the Reverse mode and ensure that no lift or curl is present on the 8th guide. If nay lift or curl is present, use the 9th guide and adjust. After adjustment, lock the guide nut.

7-4-4. Adjustments After Replacement of ACE Ass'y

When the ACE ass'y has been removed or replaced, perform the following adjustments:

1. Adjustment of tracking on the exit side
2. Positioning of CTL head (ACE ass'y)
3. Azimuth adjustment of audio head (ACE ass'y)
4. Height adjustment of audio head (ACE ass'y)

1. Adjustment of tracking on the exit side

1) **Set the parallel plate (Jig Ref. No. J-11) as shown in Fig. 7-40. Turn the tilt adjusting screw ❶ to adjust the audio head to a vertical position.**

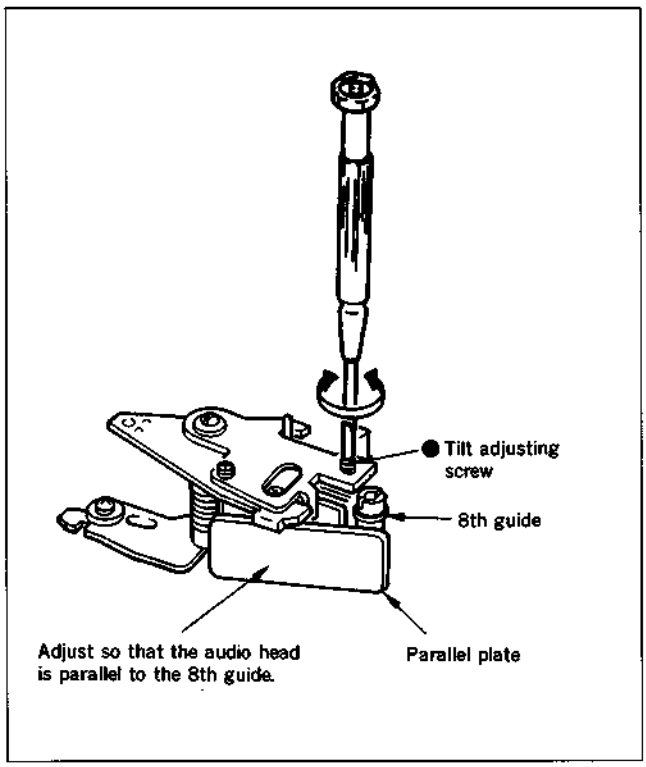


Fig. 7-40.

2) **Connect an oscilloscope to the pin ③ of the connector CN104 (on RP-148 board). Connect its external trigger to the pin ① of CN104.**
3) Reproduce the tracking portion of the alignment tape. Press the tracking button and adjust to reduce the amplitude of the RF output waveform to 60% of the peak.
4) Raise the 7th and 8th guides (by turning the respective guide nuts counterclockwise) and observe the RF output waveform when the tape is allowed to run freely. (This waveform is called exit free waveform.)

Note: Take care not to raise the guide excessively. Raise the guide by 0.2 to 0.3mm.

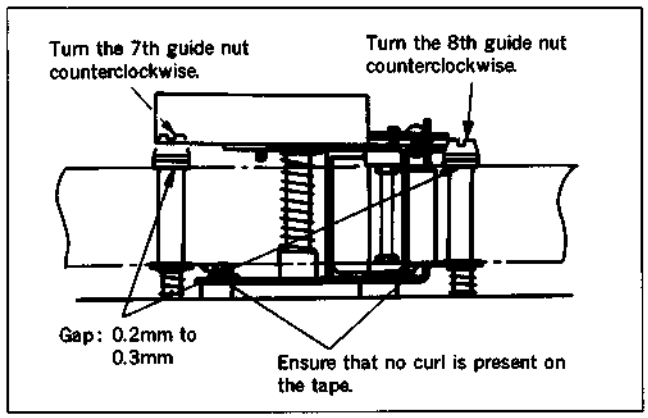


Fig. 7-41.

5) Make sure that the exit free waveform is within the range specified by the graphs (a) and (b) in Fig. 7-42.

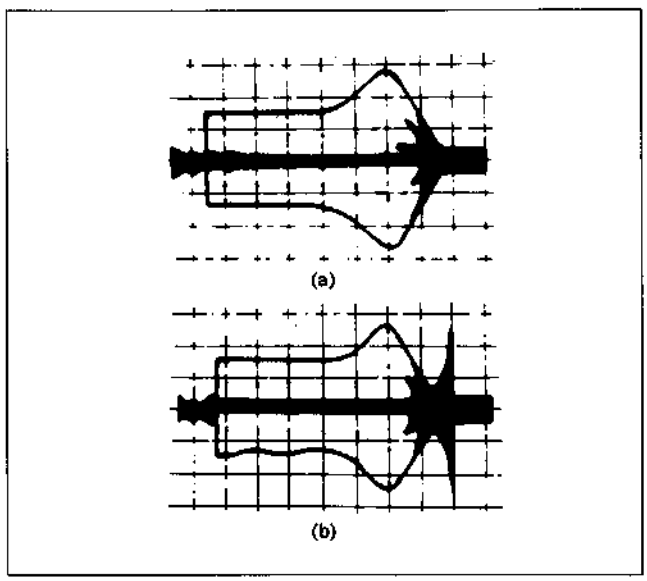


Fig. 7-42.

[Waveform Outside the Range]

- If the waveform is outside the range and it has such a shape as shown in Fig. 7-43. turn the tilt adjusting screw clockwise and adjust until the waveform is within the range.

Note: The adjusting screw should be adjusted in the direction of tightening (clockwise) to complete this adjustment.

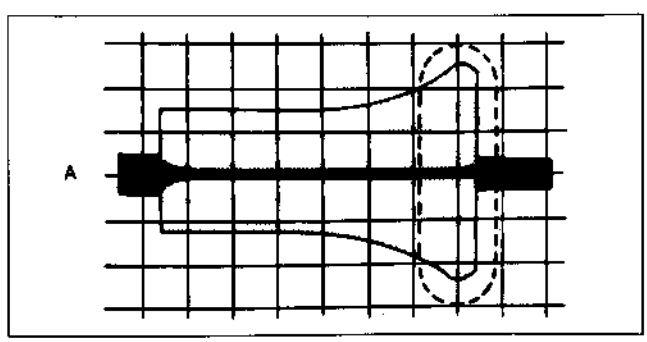


Fig. 7-43.

- **If the waveform is outside the range and it has such a shape as shown in Fig. 7-44. turn the tilt adjusting screw counterclockwise to change to the waveform A (Fig. 7-43.). Then turn the screw clockwise and adjust until the waveform is within the range.**

Note : The adjusting screw should be adjusted in the direction of tightening (clockwise) to complete this adjustment.

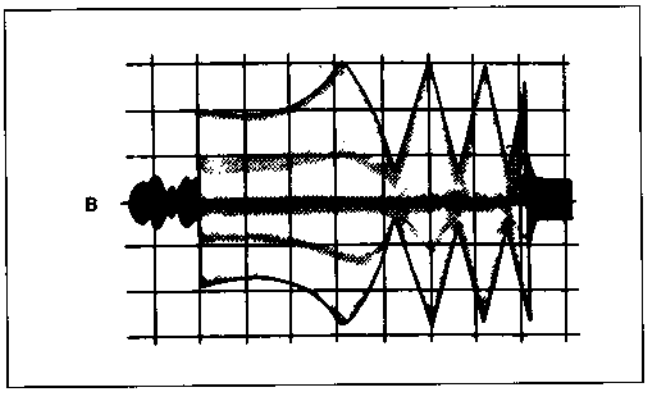


Fig. 7-44.

6) Turn the 7th guide nut clockwise and make the waveform flat. Turn the 8th guide nut clockwise and make the 8th guide contact with the tape. (Lower the 8th guide to a position just before a curl is formed on the 8th guide flange.)
7) If the RF output waveform on the exit side is a little lifted, lower the 7th and 8th guides again to make the waveform flat.

2. Positioning of CTL head (ACE ass'y)

[Connection]

Oscilloscope

1CH : Pin ③ of CN104 (RP-148 board)
2CH : Audio line output terminal
External trigger : Pin ① of CN104 (RP-148 board)

[Adjustment Procedure]

1) Reproduce the tracking signal portion of the alignment tape.
2) Verify that the RF output waveform has its peak and that the 0 level position of the audio signal appears on the B-CH waveform in the tracking center position.
If the specification is not met, perform Step 3).

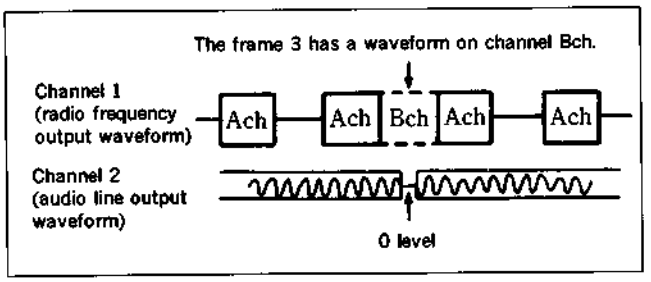


Fig. 7-45.

3) Positioning of CTL head
(1) **Set to the tracking center position (by simultaneously pressing the tracking buttons ▼ and ▲).**
(2) Loosen the two ACE ass'y positioning screws. Use a Phillips driver or other means to slide the ACE ass'y so that the amplitude of the RF output waveform is the largest (Fig. 7-46).
(3) Reproduce the color bar signal of the alignment tape and check the picture quality.
(4) Fix and lock the positioning screws.

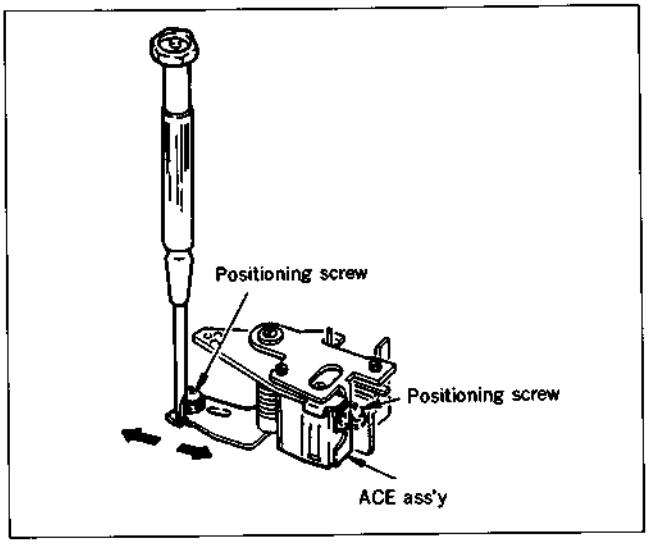


Fig. 7-46.

3. Azimuth adjustment of audio head (ACE ass'y)

[Connection]

Oscilloscope 1CH : Audio line output terminal

[Adjustment Procedure]

1) Reproduce the 5kHz, −30dB audio signal portion (RF sweep) of the alignment tape.
2) Adjust the azimuth adjusting screw so that the output level (readout of a level gauge) is at its maximum.
   Note : The adjusting screw should be adjusted in the direction of insertion (clockwise) to complete this adjustment.
3) After this adjustment is complete, lock the adjusting screw.

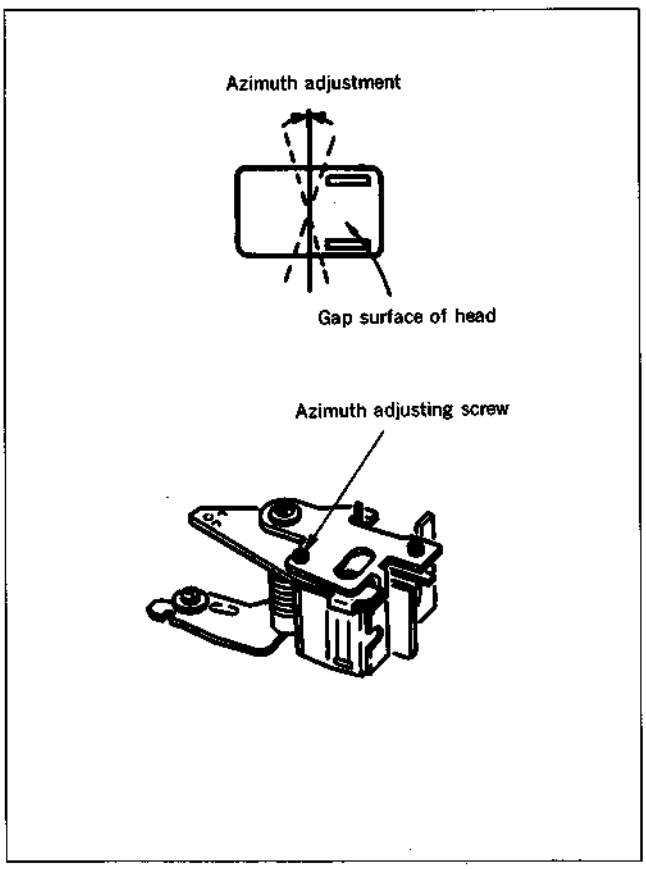


Fig. 7-47.

4. Height adjustment of audio head

[Condition]

The tracking adjustment on the exit side must be completed before making this adjustment.

[Connection]

Oscilloscope 1CH : Audio line output terminal

[Adjustment Procedure]

1) Reproduce the 5kHz, −30dB audio signal portion (RF sweep) of the alignment tape.
2) Adjust the height adjusting screw so that the amplitude of the audio line output waveform (5kHz) is at its maximum.

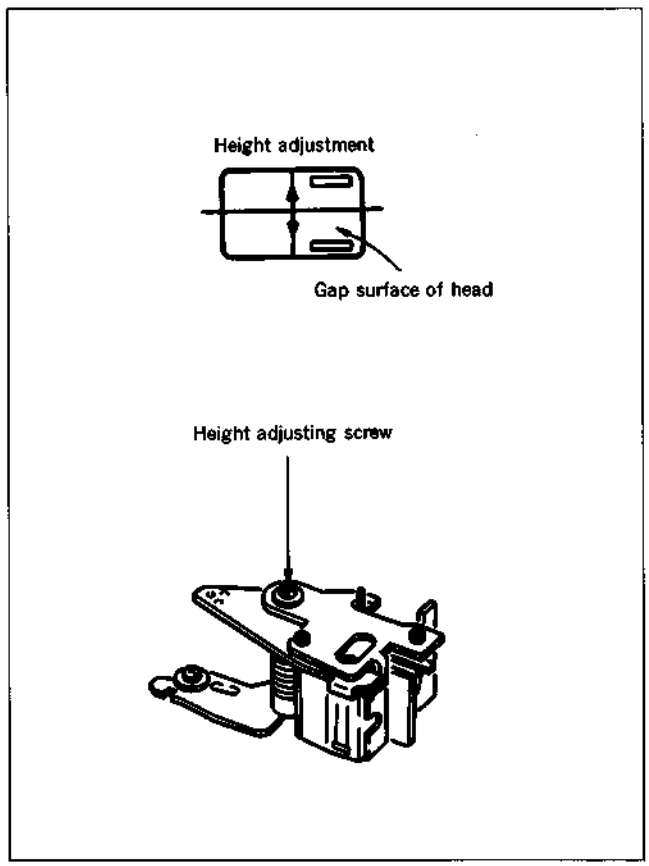


Fig. 7-48.

7-4-5. Tape Movement Distance Check when Adjusting the Tape Path

After checking the tape path as per paragraphs 7-4-1. to 7-4-4. check the tape movement distance by performing the following procedure:

1) Prepare a commercial L-830 reel. Remove the cassette cover on referring to Fig. 7-31.
2) Reproduce the L-830 prepared in Step 1). Check the following items:
   (1) Entrance side
   Check to see if the tape is not bent on the lower flange of the 4th guide, the upper flange of the 5th guide and the upper flange of the 6th guide. (There may be no problem in curling but there must be no bending.) (Fig. 7-49.)
   (2) Exit side
   Check to see if the tape is not bent on the upper flange of the 7th guide, the upper flange of the 8th guide and the upper and lower flanges of the 10th guide. (There may be no problem in curling but there must be no bending.) (Fig. 7-50.)
3) In Step 2), if the tape does not run normally on the tape path, re-adjust the tape path as follows:
   a) The tape does not run normally on the entrance side.
   Refer to Paragraph 7-4-2.
   b) The tape does not run normally on thr exit side.
   Refer to Paragraph 7-4-3.

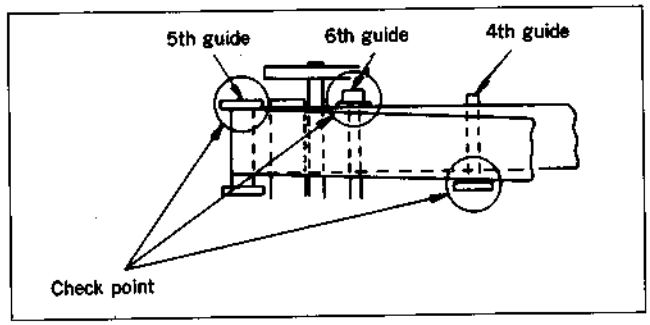


Fig. 7-49.

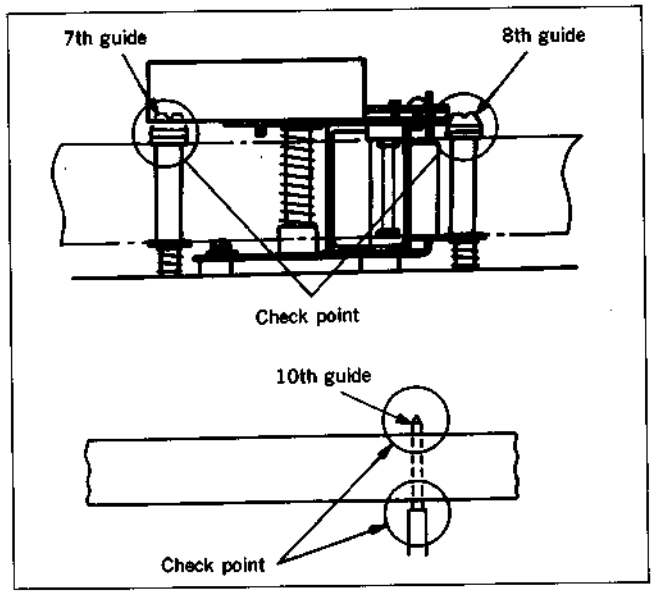


Fig. 7-50.

SECTION 8
INTERFACE AND IC PIN FUNCTION

TIMER/TUNER CONTROL—MICROPROCESSOR TERMINAL FUNCTION (MF-176BOARD IC101 : MB89085)

Pin. No.	Port	Signal	I/O	Function
1	CL1	CL1	—	Clock oscillator pin (32kHz)
2	CL0	CL0	—	Clock oscillator pin (32kHz)
3	MOD0	MOD0	I	
4	MOD1	MOD1	I	
5	X0	X0	—	Clock oscillator pin (10MHz)
6	X1	X1	—	Clock oscillator pin (10MHz)
7	Vss	Vss	—	GND
8	XRST	$\overline{\text{RESET}}$	I	Reset signal input. Low when CL button on front panel is pressed. Or, Low in case of power failure or when voltage supplied to MB89085 is below 2.5V.
9	P00/EI20	PLL ENABLE	O	Tuner enable signal
10	P01/EI21	PLL DATA	O	Tuner data signal
11	P02/EI22	PLL CLK	O	Tuner clock signal
12	P03/EI23	AFT UP	I	Tuner AFT UP signal input
13	P04/EI24	AFT DOWN	I	Tuner AFT DOWN signal input
14	P05/EI25	$\overline{\text{COSMO CS}}$	O	System control chip selsct signal
15	P06/EI26	$\overline{\text{COSMO RESET}}$	O	System control reset signal
16	P07/EI27	$\overline{\text{CG CS}}$	O	OSD chip selsct signal
17	P10/EI10	$\overline{\text{POWER FAIL}}$	I	Power failure detect signal input. Low in case of power failure or when voltage supplied to MB89085 is below 4.5V.
18	P11/EI11	$\overline{\text{V SYNC}}$	I	Vsync signal input. Vsync signal in LINE output.
19	P12/EI12	H DET	I	Video signal detect signal input. High when there is Hsync signal in LINE output.
20	P13/EI14	AFM DET	I	HiFi audio signal detect signal input. High when there is HiFi audio signal during tape play back.
21	P14(O.D.)	N.C.	O	
22	P15(O.D.)	N.C.	O	
23	P16(O.D.)	$\overline{\text{STEREO}}$	I	STEREO CH detect signal input. Low when tuner is receiving the STEREO CH.
24	P17(O.D.)	$\overline{\text{SAP}}$	I	SAP CH detect signal input. Low when tuner is receiving the audio duplex CH.
25	P20	STEREO LED	O	STEREO LED
26	P21	Beta HiFi LED	O	Beta HiFi LED
27	P22	SAP LED	O	SAP LED
28	CMOD	CMOD	I	
29	P24/SI0	$\overline{\text{JOG/CR}}$	O	Digital write control signal
30	25/SO0	TA MUTE	O	Tuner audio mute. High to mute tuner voice until tuner CH is switched and the next CH is displayed.
31	P26/SCK0	Super Beta LED	O	Super Beta LED
32	P27/RMCI	SIRCS IN	I	SIRCS signal input
33	P30	N.C.	O	
34	P31	N.C.	O	
35	P32	N.C.	O	
36	P33/PWM0	$\overline{\text{DI CS}}$	O	Digital chip selsct
37	P34/PPG0	N.C.	O	
38	P35/PPG1	POWER CONT	O	Power ON/OFF control signal. High at power ON.
39	FS00	S00	O	FDP SEGMENT 00
40	FS01	S01	O	FDP SEGMENT 01
41	FS02	S02	O	FDP SEGMENT 02
42	FS03	S03	O	FDP SEGMENT 03
43	FS04	S04	O	FDP SEGMENT 04
44	FS05	S05	O	FDP SEGMENT 05
45	FS06	S06	O	FDP SEGMENT 06
46	FS07	S07	O	FDP SEGMENT 07
47	FS08	S08	O	FDP SEGMENT 08
48	FS09	S09	O	FDP SEGMENT 09
49	Vcc	Vcc	—	UNSW 5V
50	FS10	S10	O	FDP SEGMENT 10
51	FS11	S11	O	FDP SEGMENT 11
52	FS12	S12	O	FDP SEGMENT 12
53	VFED	VFED	—	SW—30V
54	FS13	S13	O	FDP SEGMENT 13
55	FS14	N.C.	O	
56	FS15	N.C.	O	
57	FS16	N.C.	O	
58	Vss	Vss	—	GND
59	FS17	N.C.	O	
60	FS18	N.C.	O	

Pin. No.	Port	Signal	I/O	Function
61	FS19	N.C.	O	
62	FC11/FS20	N.C.	O	
63	FC10/FS21	N.C.	O	
64	FC09/FS22	N.C.	O	
65	FC08/FS23	N.C.	O	
66	FC07	G07	O	FDP GRID 07
67	Vcc	Vcc	—	UNSW+5
68	FC06	G06	O	FDP GRID 06
69	FC05	G05	O	FDP GRID 05
70	FC04	G04	O	FDP GRID 04
71	FC03	G03	O	FDP GRID 03
72	FC02	G02	O	FDP GRID 02
73	FC01	G01	O	FDP GRID 01
74	FC00	G00	O	FDP GRID 00
75	P80/STB	MEM DATA	I/O	EEPROM data signal
76	P81/XCS	MEN CLK	O	EEPROM clock signal
77	P82/SI1	T/T SI	I	T/T serial data input signal
78	P83/S01	T/T SO	O	T/T serial data output signal
79	P84/SCLK1	S CLK	O	T/T serial clock signal
80	P85/ECK	MEM CS	O	EEPROM chip select signal
81	P86/T01	N.C.	O	
82	P87/T02	N.C.	O	
83	(AVss)Vss	(AVss)Vss	—	GND
84	P90/AN00	A/D0	I	Key read A/D input 0*
85	P91/AN01	A/D1	I	Key read A/D input 1*
86	P92/AN02	A/D2	I	Key read A/D input 2*
87	P93/AN03	A/D3	I	Key read A/D input 3*
88	P94/AN04	A/D4	I	Key read A/D input 4
89	P95/AN05	N.C.	O	
90	P96/AN06	N.C.	O	
91	P97/AN07	N.C.	O	
92	(AVcc)Vcc	(AVcc)Vcc	—	USNW 5V
93	PA0/AN08	N.C.	O	
94	PA1/AN09	DEST 1	I	Destination identify A/D input 0
95	PA2/AN10	DEST 2	I	Destination identify A/D input 1
96	PA3/AN11	N.C.	O	
97	PA4/LS1	F MONO	O	Tuner audio switching signal. Low when tuner audio mode is set to MONAURAL in the mode set menu.
98	PA5/LS0	AUTO PRESET	O	Auto preset sensitivity switching signal. High when AUTO PRESET is being executed in tuner set menu.
99	PA6/COUT	BUZZER	O	Buzze output signal
100	Vcc	Vcc	—	UNSW 5V

*

Pressed key and terminal input voltage

Input terminal \ Input voltage	0V (0—0.625)	0.90V (0.625—1.25)	1.53V (1.25—1.875)	2.18V (1.875—2.5)	2.77V (2.5—3.125)	3.46V (3.125—3.75)	4.08V (3.75—4.375)	5.0V (4.375—5.0)
A/D0	EJECT	STOP	PLAY	REC				No key input
A/D1	POWER	REW	FF	PAUSE				No key input
A/D2	TIMER REC	QUICK TIMER	TAPE SPEED	EDIT	VTR1	VTR2		VTR3
A/D3	SUPER Beta	INPUT SELECT	TV/ VTR	CHANNEL (+)	CHANNEL (—)	L500	L750	L830

SECTION 9
ELECTRICAL ADJUSTMENTS

See the adjusting part location diagram from on page 232 for the adjustment.

In these electrical adjustments, the following measuring equipment are used.

[Equipment Used]

1) Monitor TV
2) Oscilloscope, dual channel, a bandwidth of 30MHz or more, with delay mode
   (Unless otherwise specified, a 10 : 1 probe should be used.)
3) Frequency counter
4) Pattern generator (with video output terminal)
5) Digital voltmeter
6) Audio generator
7) Audio level meter
8) Audio distortion factor meter
9) Audio attenuator
10) Multichannel audio signal generator
11) Alignment tape
    for normal beta (KR5-1V)
    Part code : 8-969-995-92

[Equipment Connection]

Unless otherwise specified, each measuring equipment is connected as illustrated below for adjustment.

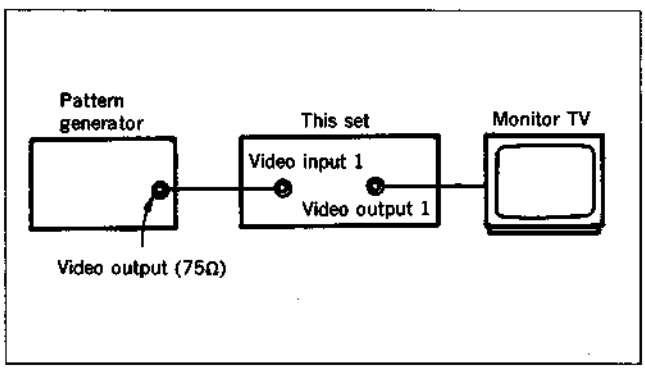


Fig. 9-1.

[Setup for Adjustment]

For the electrical adjustments, a video signal obtained from a NTSC pattern generator is used as adjustment signal. This video signal must satisfy the specification. Connect an oscilloscope to the video input terminal 1. Verify that the video signal's synchronizing signal has an amplitude of approximately 0.3V, and that its video portion has an amplitude of approximately 0.7V and that its burst signal has an amplitude of approximately 0.3V and is flat.

The video signal (color bar) used for adjustment is shown in Fig. 9-2.

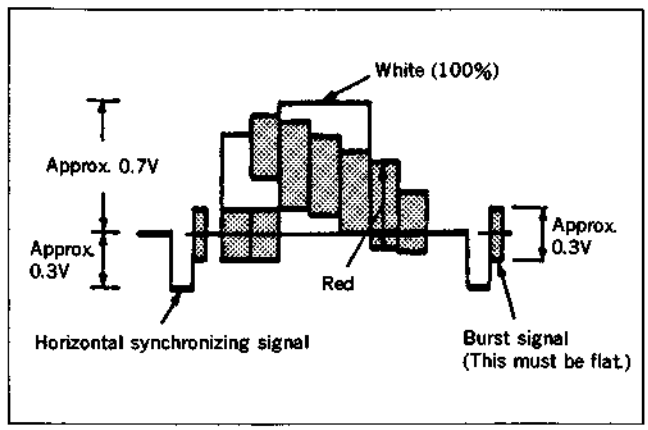


Fig. 9-2. Color bar signal of pattern generator

[Alignment Tape]

KR5-1V

	Mode	Video signal	Audio signal	Time
1	βII	Color bar	3kHz, −10dB	4 min. each
2		Monoscope	333Hz, −30dB	
3		RF sweep	5kHz, −30dB	
4		Tracking	1kHz, −10dB	
5		Color bar	Beta hi-fi 400Hz ±25kHz DEV (−10dB)	
6	βIII	Color bar	3kHz, −10dB	
7		Monoscope	5kHz, −30dB	

Inputs and Outputs

LINE IN

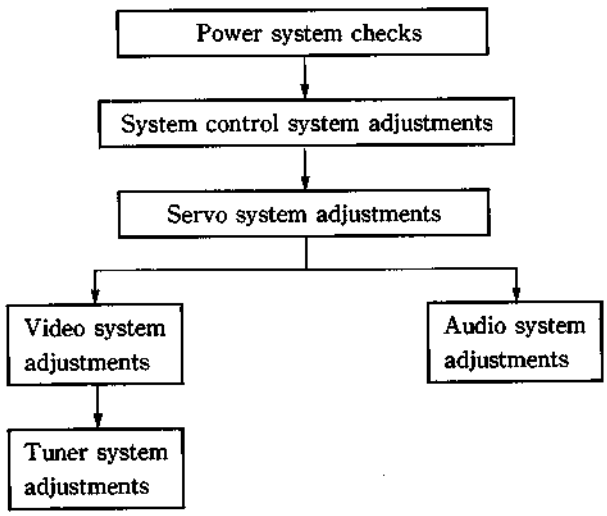
VIDEO IN 1 and 2 (phono jacks)
Input signal: 1 Vp-p, 75 ohms, unbalanced, sync negative
AUDIO IN 1 and 2 (phono jacks)
Input level: –7.5 dBs
(0 dBs = 0.775 Vrms)
Input impedance: more than 47 kilohms

LINE OUT

VIDEO OUT (phono jack)
Output signal: 1 Vp-p, 75 ohms, unbalanced, sync negative
AUDIO OUT (phono jacks)
Standard output: –7.5 dBs at load impedance 47 kilohms
Output impedance: less than 10 kilohms

[Adjusting Sequence]

The electrical adjustments should be carried out in the following sequence.



9-1. POWER SUPPLY CHECK (SR-600 BOARD)

Mode	E-E
Measurement Equipment	Digital voltmeter
UNSW 5.3V check	
Measurement Point	Pin ④ of CN1
Specified Value	5.3±0.25 Vdc
MTR 12V check	
Measurement Point	Pin ⑫ of CN1
Specified Value	12.3 ± 0.3 Vdc
SW 12V check	
Measurement Point	Pin ① of CN1
Specified Value	12.0±0.3 Vdc
SW 5V check	
Measurement Point	Pin ③ of CN1
Specified Value	5.1±0.2Vdc
+40V check	
Measurement Point	Pin ⑧ of CN1
Specified Value	40.0±0.3 Vdc
–30V check	
Measurement Point	Pin ⑤ of CN 2
Specified Value	−28.5±2.5Vdc
DC 3.3V check	
Measurement Point	Between Pin ⑥ and Pin ⑦ of CN2
Specified Value	3.0±0.3Vdc

Checking Method:

1) Confirm that each voltage meets the specified value.

9-2. SYSTEM CONTROL SYSTEM ADJUSTMENTS

9-2-1. Clock Adjustment (MF-176 Board)

Mode	E-E
Signal	No signal
Measurment point	Pin ⑨⑨ of IC101
Measuring instrument	Interval counter
Adjustment element	CT101
Specified value	0.1249995±0.0000005sec

[Adjustment Procedure]

1) Connect a 9-stage binary counter to Pin ⑨⑨ of IC101 and measure the output of the counter.
2) Use CT101 and adjust to 0.1249995±0.0000005sec.

Note: CT101 should be adjusted only when IC101 has been replaced.

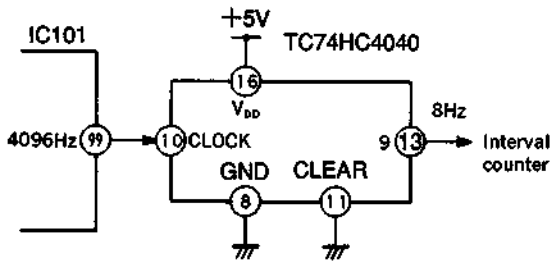


Fig. 9-3.

9-3. SERVO SYSTEM ADJUSTMENTS

9-3-1. Switching Position Adjustment (MA-150 Board)

Mode	Playback (βⅡmode)
Signal	Arbitrary
Measurment points	CH1 : Pin ① of CN104 (RF SW P/RP-148 board) CH2 : Pin ⑥⑧ of IC301 (D PG)
Measuring instrument	Oscilloscope
Adjustment element	RV310
Specified value	t=1.4±0.1msec

[Adjustment Procedure]

1) Press the tracking switch, then simultaneously press the ▼and ▲ switches and select the auto tracking OFF and the center position.
2) Short pins 1-2 of CN303 with a jumper wire.
3) Adjust RV310 so that t=1.4±0.1msec.
4) After adjustment, remove the jumper wire.

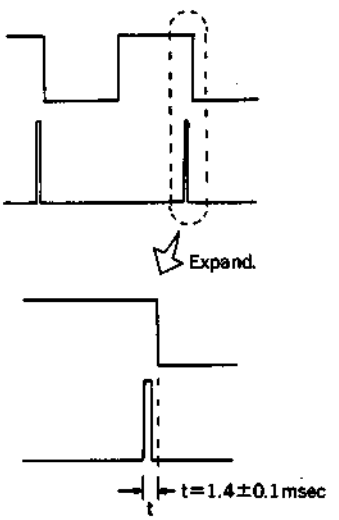


Fig. 9-4.

9-3-2. Slow Tracking Center Adjustment (MA-150 Board)

Mode	×1/5 slow playback (βII mode)
Signal	Monoscope (self-recorded)
Measurment point	Monitor screen
Measuring instrument	
Adjustment element	RV311
Specified value	No noise must be observed.

[Adjustment Procedure]

1) Press the tracking switch, then simultaneously press the ▼and ▲ switches and select the slow tracking and the center position.
2) Adjust RV311 so that there is no noise observed on the screen.

9-4. VIDEO SYSTEM ADJUSTMENTS

It is expected to adjust the playback system with the alignment tape and then confirm that the system is normal before adjusting the recording system. The adjustment sequence is shown below. The Y signal system and chroma signal adjustments are intended for both the playback and recording systems.

A color video signal supplied by a pattern generator is used as video input signal for video system adjustments in the Record mode.

Verify that its synchronizing and color burst signals satisfy the specification provided in the setup for adjustment in Fig. 9-2.

[Playback System Adjustments]

1. Playback Y signal level adjustment

[Recording System Adjustments]

1. SYNC AGC adjustment
2. CCD level adjustment
3. Sync tip carrier set and deviation
4. Chroma recording level adjustment
5. Y signal recording current adjustment

9-4-1. Playback System adjustments

1. Playback Y Signal Level Adjustment (YC-128 Board)

Mode	Playback
Signal	Alignment tape βII color bar
Measurment point	Pin ① of CN002
Measuring instrument	Oscilloscope
Adjustment element	RV101
Specified value	1.00±0.05Vp-p

[Adjustment Procedure]

1) Use RV101 and adjust to 1.00±0.05Vp-p.

Fig. 9-5.

9-4-2. Recording System Adjustments

1. SYNC AGC Adjustment (YC-128 Board)

Mode	E-E
Signal	Color bar
Measurment point	Pin ① of IC002
Measuring instrument	Oscilloscope
Adjustment element	RV102
Specified value	1.00±0.05Vp-p

[Adjustment Procedure]

Use RV102 and adjust to 1.00±0.05Vp-p.

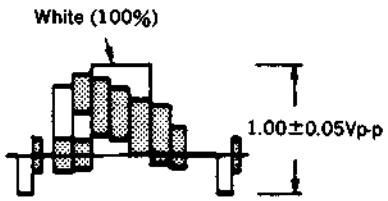


Fig. 9-6.

2. CCD Level Adjustment (YC-128 Board)

Mode	E-E
Signal	Color bar
Measurment point	CH1: Pin ⑩ of IC101 CH2: Pin ⑫ of IC101
Measuring instrument	Oscilloscope (INV mode)
Adjustment element	RV104
Specified value	10±8mVp-p

[Adjustment Procedure]

1) Set oscilloscope to ADD mode.
2) Use RV104 and adjust to 10±8mVp-p.

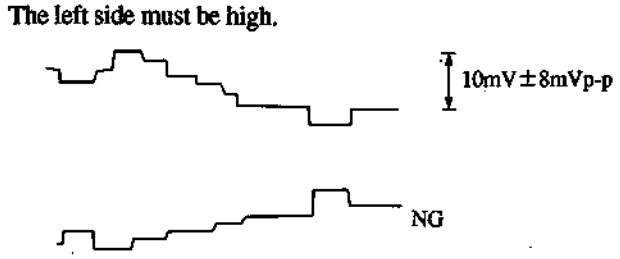


Fig. 9-7

3. Sync Tip Carrier Set and Deviation Adjustment (YC-128 Board)

Notes :
- Always ensure that Item 3. "Playback Y signal level adjustment of Paragraph 9-4-1. is satisfied before making this adjustment.
- Set the SHB switch to ON.
- Set the REC MODE switch to βII.

A. Sync tip carrier set adjustment (YC-128 Board)

Mode	E-E
Signal	No signal
Measurment point	Pin ㉚ of IC101
Measuring instrument	Frequency counter
Adjustment element	RV106
Specified value	4.40±0.05MHz

[Adjustment Procedure]

1) Use RV106 And adjust to 4.40±0.05MHz.

Fig. 9-8.

B. Deviation adjustment (YC-128 Board)

Mode	Self-recording playback
Signal	Color bar
Measurment point	Line 2 output video terminal
Measuring instrument	Oscilloscope
Adjustment element	RV105
Specified value	1.00±0.05Vp-p

[Adjustment Procedure]

1) Record the color bar signal and reproduce the recorded portion.
2) Check the level of the reproduced Y signal of the video output.
   Specification : 1.00±0.05Vp-p
3) If outside the specification range, adjust RV105 and repeat Steps 1) and 2).

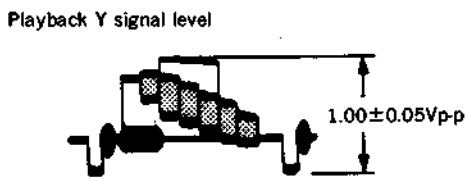


Fig. 9-9.

4. Chroma Recording Level Adjustment (YC-128 Board)

Mode	Record (βII)
Signal	Color bar
Measurment point	Pin ⑭ of CN002
Measuring instrument	Oscilloscope
Adjustment element	RV201
Specified value	240±15mVp-p

[Adjustment Procedure]

1) Use RV201 and adjust to 240±15mVp-p.

Fig. 9-10.

5. Y Signal Recording Current Adjustment (RP-148 Board)

Note : Set the SHB switch to ON.

Mode	Record (βII)
Signal	No signal
Measurment point	Pin ① of CN105
Measuring instrument	Oscilloscope
Adjustment element	RV101
Specified value	3.4±0.1Vp-p

[Adjustment Procedure]

1) Use RV101 and adjust to 3.4±0.1Vp-p.

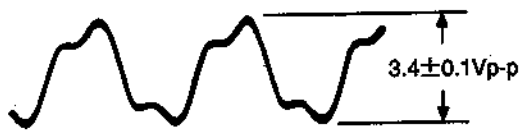


Fig. 9-11.

9-5. AUDIO SYSTEM ADJUSTMENTS

- For the audio system adjustments, unless there is a note, use the normal beta cassette (dynamicron standard type L125 to L500) and select the βII mode. Use KR5-1V as the alignment tape.
- Adjust both LCH and RCH.

[Equipment Connection]

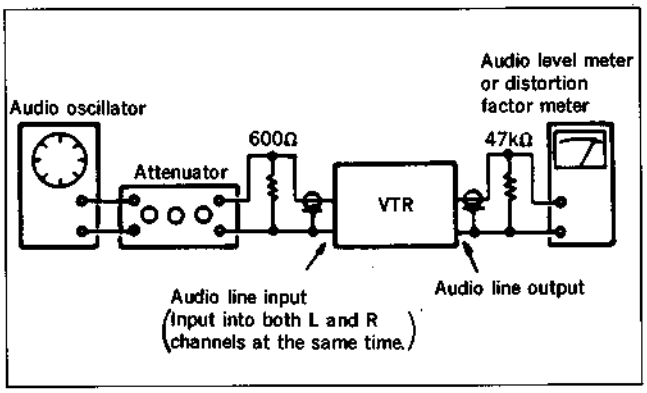


Fig. 9-12.

9-5-1. BETA HIFI Audio System Adjustments

Unless otherwise specified, place the set in the following modes and perform the adjustment.

Input selection .....Line 1 or 2
(The line to which an audio oscillator is connected.)
Audio monitor .....Hi-fi and Stereo
REC LEVEL .....Center position (50)

[Adjustment Sequence]

1. REF 150kHz check
2. Carrier frequency check
3. IS pulse frequency check
4. SNR REF adjustment
5. REC GAIN adjustment
6. Playback level check
7. Overall level characteristic, distortion factor and S/N check
8. Overall frequency characteristic check

1. REF 150kHz Check (AF-55 Board)

Mode	E-E
Measurment point	Pin ㊻ of IC003
Measuring instrument	Frequency counter
Specified value	149473±10Hz

[Checking Procedure]

1) Verify that the frequency ocillation meets the specified value.

149473±10Hz

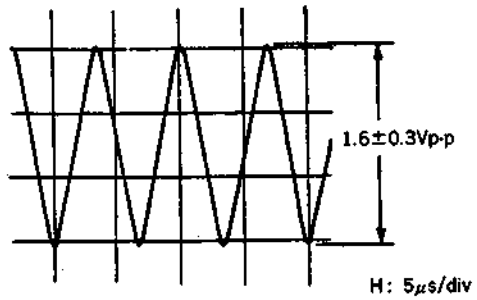


Fig. 9-13.

2. Carrier Frequency Check (AF-55 Board)

Mode	Record
Measuring instrument	Frequency counter
Check for at 1.83MHz.	
Measurment point	Pin ⑨ of IC003
Specified value	1.83±0.1MHz
Check for at 1.38MHz.	
Measurment point	Pin ㊴ of IC003
Specified value	1.38±0.1MHz
Check for at 1.53MHz.	
Measurment point	Pin ㊱ of IC003
Specified value	1.53±0.1MHz
Check for at 1.68MHz.	
Measurment point	Pin ⑪ of IC003
Specified value	1.68±0.1MHz

Note : Set the REC LEVEL to the lowest position.

[Checking Procedure]

1) Connect a frequency counter to each measuring point.
2) Verify that the frequency meets the specified value at each measuring point.

Pin ⑨ of IC003 1.83±0.1MHz
Pin ㊴ of IC003 1.38±0.1MHz
Pin ㊱ of IC003 1.53±0.1MHz
Pin ⑪ of IC003 1.68±0.1MHz

Fig. 9-14

3. IS Pulse Check (AF-55 Board)

Mode	E-E
Signal	Arbitrary
Measurment point	CH1 : Pin ③ of CN003 (RF SW PULSE) CH2 : Q403 collector
Measuring instrument	Oscilloscope (DC range)

[Checking Procedure]

1) Verify that the correction pulse width (each of twl and tw2) is approximately 300μsec at 4Vdc.
2) Connect the CH2 probe of an oscilloscope to Q404 collector and verify that the correction pulse is an inverse characteristic to the pulse of Q403 collector.

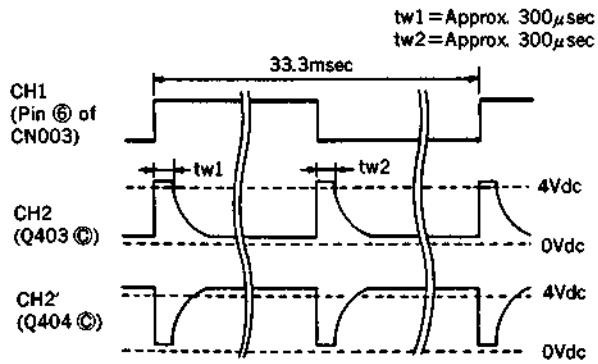


Fig. 9-15.

4. SNR REF Adjustment (AF-55 Board)

[ ] indicates the adjustment element on R channel.

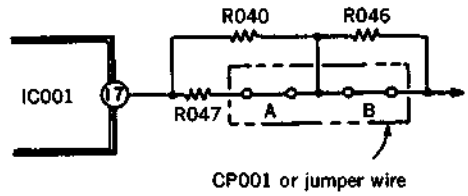
Mode	Record
Signal	400Hz
Measurment point	Pin ⑥ of IC001 [Pin ㊲ of IC001]
Measuring instrument	Audio level meter
Specified value	−20.0±0.25dBs

[Checking Procedure]

1) Use Pin ③ of IC001 [Pin ㊵ of IC001] and adjust so that the input signal level is −26.5±0.1dBs at 400Hz.
2) Connect an audio level meter to Pin ⑥ of IC001 [Pin ㊲ of IC001]
3) Verify that the 400Hz signal levels on the L and R channels are at −20.0±0.25dBs.
4) If the above specification is not met, perform the following adjustment.

[Adjustment Procedure]

1) Remove CP001.
2) Short each of A section (on the R047 side) and B section (on the R046 side).
3) Measure the 400Hz signal level. Depending on the level, open A or B section as specified in Fig. 9-16.



400Hz signal level (dBs)	A	B
−19.9 to −20.1	Short	Short
−19.7 to −19.9	Short	Open
−19.5 to −19.7	Open	Short
−19.3 to −19.5	Open	Open

Fig. 9-16.

5. REC GAIN Adjustment (AF-55 Board)

[ ] indicates the adjustment element on R channel.

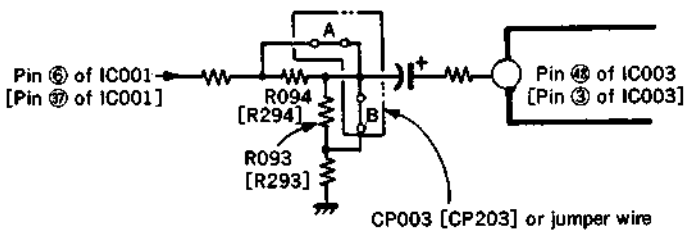
Mode	Record and Playback
Signal	400Hz
Measurment point	Pin ③ of IC001 [Pin ㊵ of IC001]
Measuring instrument	Audio level meter
Specified value	−19.75±0.6dBs [−19.85±0.6dBs]

[Checking Procedure]

1) Use Pin ③ of IC001 [Pin ㊵ of IC001] and adjust so that the input signal level is −26.5±0.1dBs at 400Hz.
2) Record.
3) Reproduce the recorded portion.
4) Verify that the playback level meets the specified value.
5) If the above specification is not met, perform the following adjustment.

[Adjustment Procedure]

1) Remove CP003 [CP203]
2) Short each of A section (on the R094 [R294] side) and B section (on the R093 [R293] side).
3) Check the REC GAIN. Depending on the playback level, open A or B section as specified in Fig. 9-17.



Playback level (dBs)	A	B
−20.35～ [−20.45～]	Open	Short
−19.05～−20.35 [−20.45～−20.45]	Short	Open
～−19.05 [～−19.25]	Short	Open

Fig. 9-17.

6. Playback Level Check

This check should be made on both L and R channels.

Mode	Playback
Signal	Alignment tape BETA HIFI portion
Measurment point	Line output audio terminal (terminated at 47kΩ)
Measuring instrument	Audio level meter
Specified value	−7.5±2dBs on both L and R

[Checking Procedure]

1) Check that the playback level is −7.5±2dBs on both L

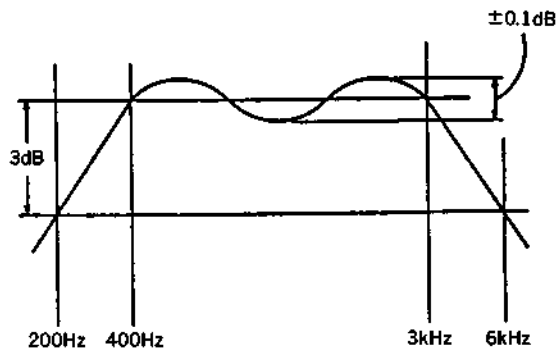
7. Overall Level Characteristic, Distortion Factor and S/N Check

This check should be made on both L and R channels.

Mode	Record and Playback (βIII)
Signal	400Hz, −7.5dBs signal to the line audio input terminal
Measurment point	Line output audio terminal (terminated at 47kΩ)
Measuring instrument	Audio level meter and distortion factor meter
Specified value	−10±2dBs

[Checking Procedure]

1) Place the REC LEVEL in the center position (50).
2) Record. (400Hz signal recording)
3) Short the audio input terminal to set to no signal input.
4) Record. (No signal recording)
5) Reproduce the 400Hz signal portion.
6) Verify that the playback level is −7.5±2dBs and that the level difference between L and R channels is within 2dB.
7) Verify that the distortion factor is 0.3% or less. (The value when BPF is used in Fig. 9-18. Approx. 0.7% when BPF is not used.)
8) Reproduce the no signal portion. Verify that the difference between the 400Hz playback level and the no signal playback level is 65dB* or more. (* when A curve filter is used.)



fCL=12dB/Oct at 200Hz or less
fCL=12dB/Oct at 6kHz or less

Fig. 9-18.

8. Overall Frequency Characteristic Check

This check should be made on both L and R channels.

Mode	Record and Playback
Signal	The following audio signals are input to the line 1 input audio terminal in sequence: 1. 400Hz, −20dBs 2. 20Hz, −20dBs 3. 10kHz, −20dBs 4. 20kHz, −20dBs
Measurment point	Line output audio terminal (terminated at 47kΩ)
Measuring instrument	Audio level meter
Specified value	With the 400Hz playback level as reference, the playback levels of the input signals must be: 20Hz : $\pm\frac{1}{3}$dB 10kHz : $\pm\frac{1}{2}$dB 20kHz : $\pm\frac{1}{5}$dB

[Checking Procedure]

1) Place the REC level in the center position (50).
2) Record the above four audio signals for about 5 seconds each in sequence.
3) Reproduce the recorded portion.
4) Ensure that with the 400Hz playback level as reference, the playback levels of the input signals meet the following specification:
   20Hz : $\pm\frac{1}{3}$dB
   10kHz : $\pm\frac{1}{2}$dB
   20kHz : $\pm\frac{1}{5}$dB

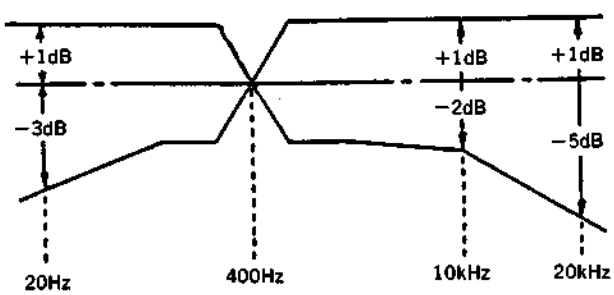


Fig. 9-19.

9-5-2. Normal Audio System Adjustment

- Unless otherwise specified, select the βII mode for this adjustment. And the normal beta cassette (dynamicron standard type, L125 to L500) should be used.
- Place the set in the following modes for this adjustment.
  INPUT SELECT LINE1
  AUDIO MONITOR ....NORMAL

[Adjustment Sequence]

1. ACE head adjustment....Refer to the MECHANICAL PART ADJUSTMENTS.
2. Playback frequency characteristic check
3. E-E output level check
4. Recording bias adjustment
5. Overall level characteristic and distortion factor check
6. Overall S/N check

1. ACE Head Adjustment

Refer to Paragraph 7-4-4.

2. Playback Frequency Check

Mode	Playback
Signal	Alignment tape (KR5-1V) βIII333Hz (monoscope) and 5kHz (RF sweep) portions
Measurment point	Line output audio L terminal
Measuring instrument	Audio level meter
Specified value	5kHz signal must be $0\pm\frac{2}{5}$dB with respect to 333Hz signal.

[Checking Procedure]

1) Reproduce 333Hz and 5kHz portions. Ensure that the 5kHz signal level is $0\pm\frac{2}{5}$dB with respect to the 333Hz signal level.

3. E-E Output Level Check

Mode	E-E
Signal	L, R : 333Hz, −7.5dBs
Measurment point	Line output audio L terminal
Measuring instrument	Audio level meter
Specified value	−7.5±2dBs

[Checking Procedure]

1) Input 333Hz, −7.5dBs signal to the audio input terminals on L and R channels at the same time.
2) Make sure that the audio output level is −7.5±2dBs.

4. Recording Bias Adjustment (MA-150 Board)

Mode	Record and Playback (βII)
Signal	333Hz, −20dBs 7kHz, −20dBs
Measurment point	Line output audio L terminal
Measuring instrument	Audio level meter
Adjustment element	RV650
Specified value	0±2dBs

Note : The "playback frequency check" as well as "playback output level adjustment" must be previously carried out.

[Checking Procedure]

1) Supply 333Hz, −20dBs signal to the audio line input.
2) Connect an audio level meter to the audio line output.
3) Adjust an attenuator connected so that the audio level meter indicates −20dBs.
4) Run the βII mode for recording.
5) Change the audio line input signal to 7kHz and record it.
6) Reproduce the recorded portion and measure the output levels of the 333Hz and 7kHz signals.
7) Make sure that the 7kHz playback output level is 0±2dB with respect to the 333Hz playback output level.
   If outside the specification, adjust RV650 and repeat Steps 1) to 7).

5. Overall Level Characteristic and Distortion Factor Adjustment

Mode	Record and Playback
Signal	333Hz, −7.5dBs
Measurment point	Line output audio L terminal
Measuring instruments	Audio level meter and distortion factor meter
Specified values	Playback level : −7.5±2dBs Distortion factor : 4% or less

[Checking Procedure]

1) Supply 333Hz, −7.5dBs signal to the audio line input terminals on L and R channels at the same time.
2) Record.
3) Reproduce the recorded portion.
4) Make sure that the playback level is −7.5±2dBs.
5) Make sure that the distortion factor is 4% or less.

6. Overall S/N Check

Mode	Record and Playback
Signal	333Hz, −7.5dBs and no signal
Measurment point	Line output audio L terminal
Measuring instrument	Audio level meter
Specified value	36dB or more

[Checking Procedure]

1) Supply 333Hz signal to the audio line input L and R terminals at the same time. Adjust an attenuator connected so that the audio line output level is −7.5dBs.
2) Record.
3) Hold the Record mode and provide no signal input (by shorting both L and R terminals.)
4) Reproduce the recorded portion. Make sure that the level difference between the 333Hz portion and the no signal portion (just after the 333Hz signal) is 36dB or more.

9-6. TUNER SYSTEM ADJUSTMENT

9-6-1. RF AGC Adjustment (TU-132 Board)

Signal	Broad cast TV signal
Adjustment Element	RV002

Adjustment Method:

1) Adjust the monitor TV to a maximum contrast.
2) Turn the RV002 to make snow noise visible.
3) Turn the RV002 in an opposite direction and set it to the point where the snow noise disappears.
4) Receive each channel and confirm that there are no beat picture or snow noise due to cross modulation.

9-6-2. Audio Multiple Recorder Adjustment

1. Stereo Filter and VCO Adjustment (TU-132 board)

[Connection]

1) Connect the audio generator, frequency counter, 10 μF capacitor (1-124-261-00) and 600Ω resistor (1-249-410-11 2pcs) as follows.
2) Tuner should be received no signal.

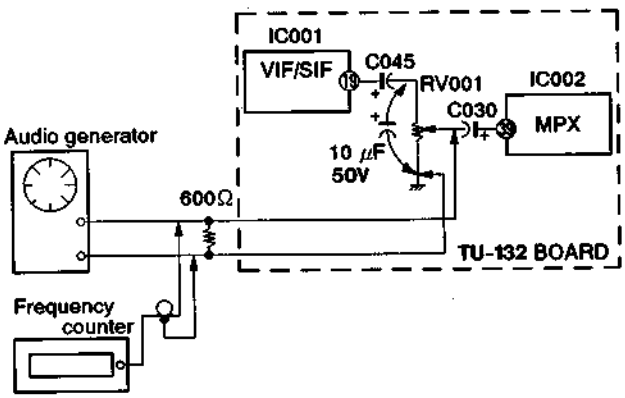


Fig. 9-20.

1-1. Stereo Filter Adjustment

Signal	22.9 kHz, 700 mVp-p
Measurement Point	Pin ㉘ of IC002
Measurement Equipment	Oscilloscope
Adjustment Element	RV071
Specified Value	4 mVp-p or less

Adjusting Method:

1) Connect the oscilloscope to Pin ㉙ of IC002
2) Adjust audio generator output level so that signal level of 22.9 kHz becomes 700 mVp-p.
3) Connect the oscilloscope to Pin ㉘ of IC002
4) Make signal level of 22.9 kHz minimum using RV071.

1-2. VCO Adjustment

Signal	15.734 kHz, 140 mVp-p
Measurement Point	Pin ㊵ of IC002
Measurement Equipment	Oscilloscope (DC range)
Adjustment Element	RV072
Specified Value	The volt difference should be 0 ± 0.1 Vdc against when no signal input.

Adjustment Method:

1) Connect the oscilloscope to Pin ㉙ of IC002.
2) Adjust audio generator output level so that signal level of 15.734 kHz becomes 140 mVp-p.
3) Connect the oscilloscope to Pin ㊵ of IC002. (The oscilloscope is DC range.)
4) Turn the audio generator OFF and measure DC level. (DC level in no signal is approximately 4.5 Vdc.)
5) Turn the audio generator ON.
6) Make DC level equal to that in no signal using RV072.
7) Make sure that Pin ⑥ of CN001 ($\overline{\text{STEREO}}$) is "L" level.

2. Separation Adjustment (TU-132 board)

Make adjustment by connecting the audio multiple signal generator to VHF/UHF input terminal.

2-1. MPX Input Level Rough Adjustment

Signal	Monaural RF signal (400 Hz, 100% MOD)
Measurement Point	Pin ㊾ of IC002
Measurement Equipment	Oscilloscope
Adjustment Element	RV001
Specified Value	245 ± 25 mVp-p (–10 ± 1 dBs)

Adjustment Method:

1) Set for 245 ± 25 mVp-p using RV001.

2-2. Separation Rough Adjustment

Signal	Stereo RF signal (L: 400 Hz, R: 2 kHz 30% MOD)
Measurement Point	R: Pin ④ of CN002 L: Pin ⑥ of CN002
Measurement Equipment	Oscilloscope
Adjustment Element	R: RV073 L: RV070
Specified Value	Cross talk component is minimum.

Adjustment Method:

1) Connect the oscilloscope to Pin ④ of CN002
2) Make cross talk component (400 Hz) mixed to 2 kHz signal minimum using RV073.
3) Connect the oscilloscope to Pin ⑥ of CN002
   Make cross talk component (2 kHz), mixed to 400 Hz signal, minimum using RV070.
4) Repeat steps 1) through 3). (The procedure should be ended at 3).)

2-3. Separation fine adjustment

Signal	Stereo RF signal (L: 400 Hz, R: 2 kHz 30% MOD)
Measurement Point	R: Pin ④ of CN002 L: Pin ⑥ of CN002
Measurement Equipment	Oscilloscope
Adjustment Element	R: RV001 L: RV070
Specified Value	Cross talk component is minimum.

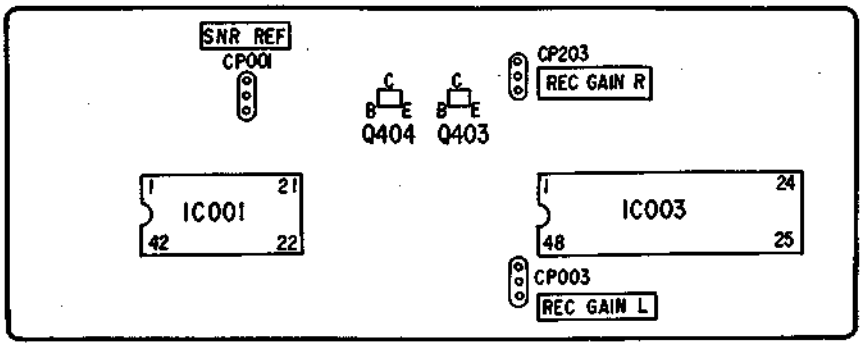
Adjustment Method:

1) Connect the oscilloscope to Pin ④ of CN002
2) Make cross talk component (400 Hz), mixed to 2 kHz signal, minimum using RV001.
3) Connect the oscilloscope to Pin ⑥ of CN002
4) Make cross talk component (2 kHz), mixed to 400 Hz signal, minimum using RV070.
5) Make sure that the cross talk component of Pin ④ and ⑥.

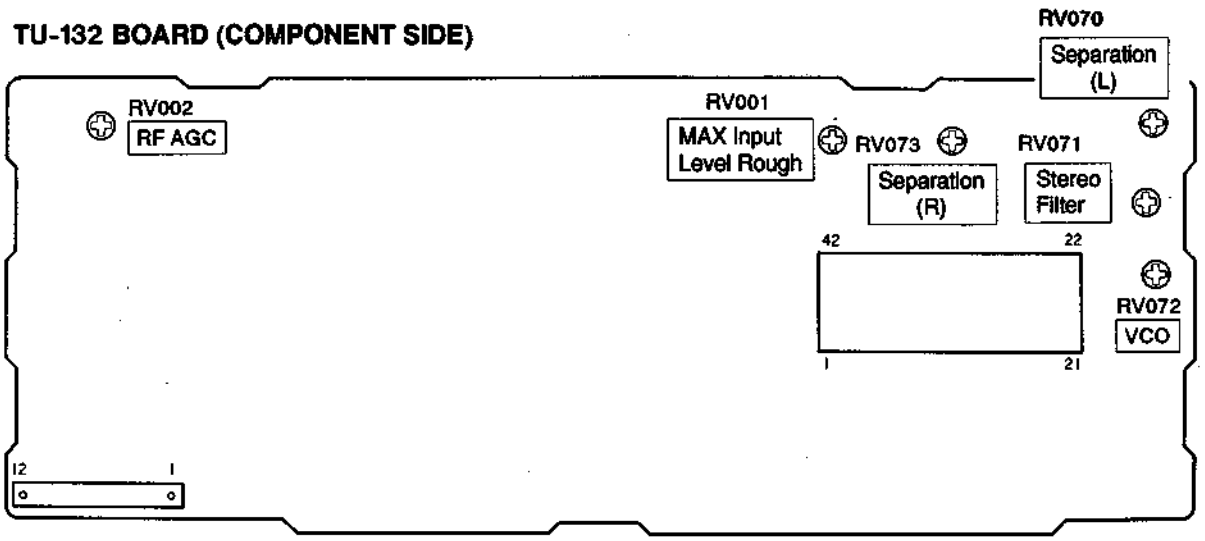
* If this adjustment can not be succeeded, repeat steps from "Separation rough adjustment". (The procedure should be stopped at "Separation fine adjustment" 5.)

9-7. ARRANGEMENT DIAGRAM FOR ADJUSTMENT PARTS

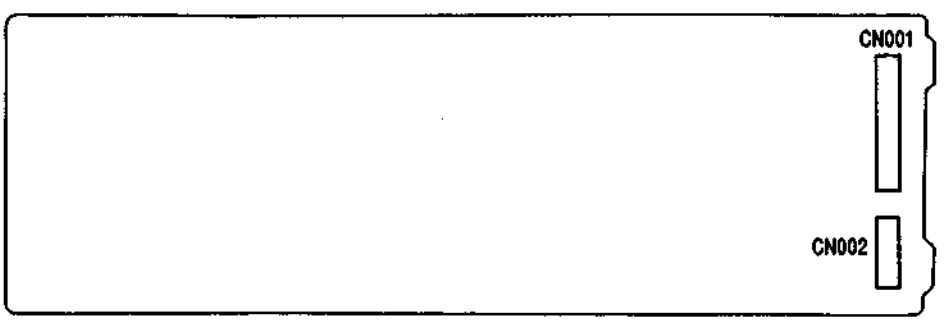
AF-55 BOARD (CONDUCTOR SIDE)



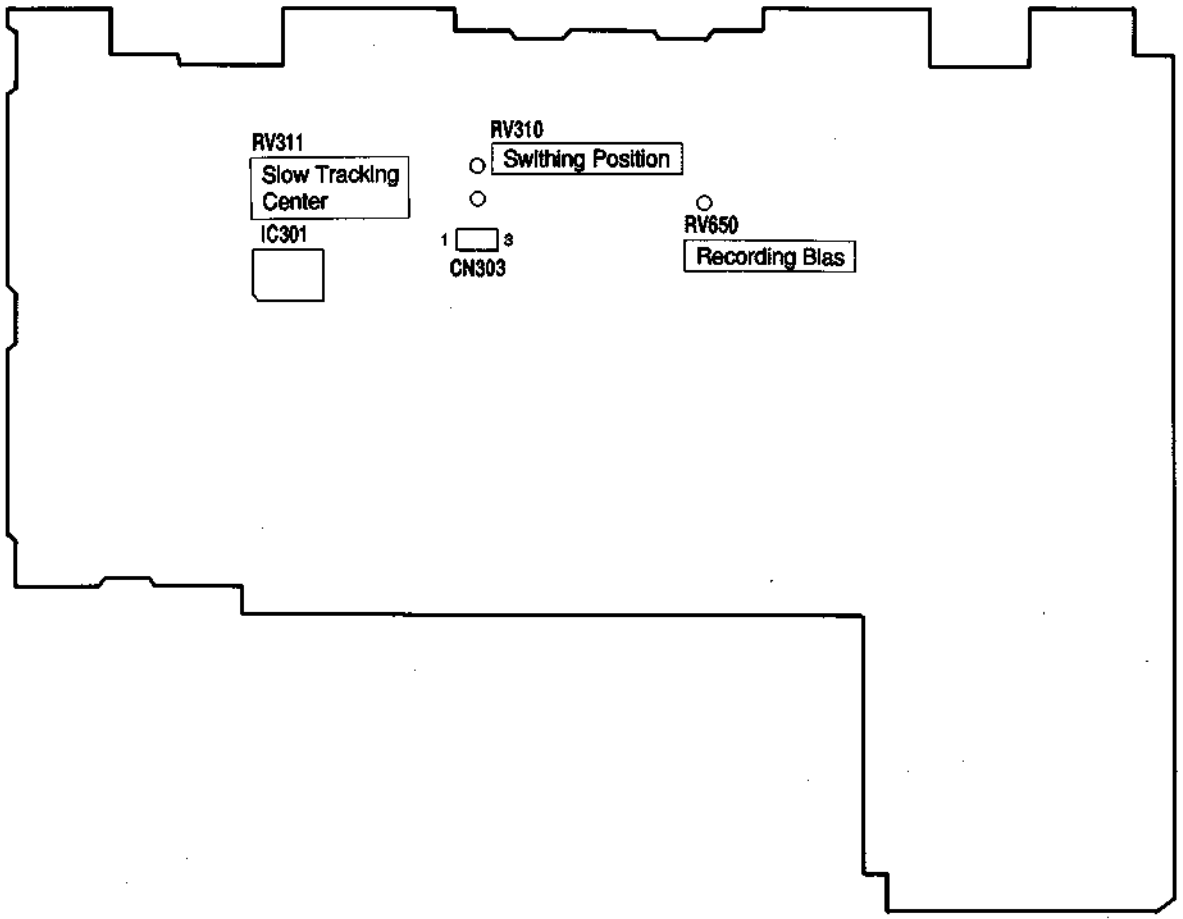
TU-132 BOARD (COMPONENT SIDE)



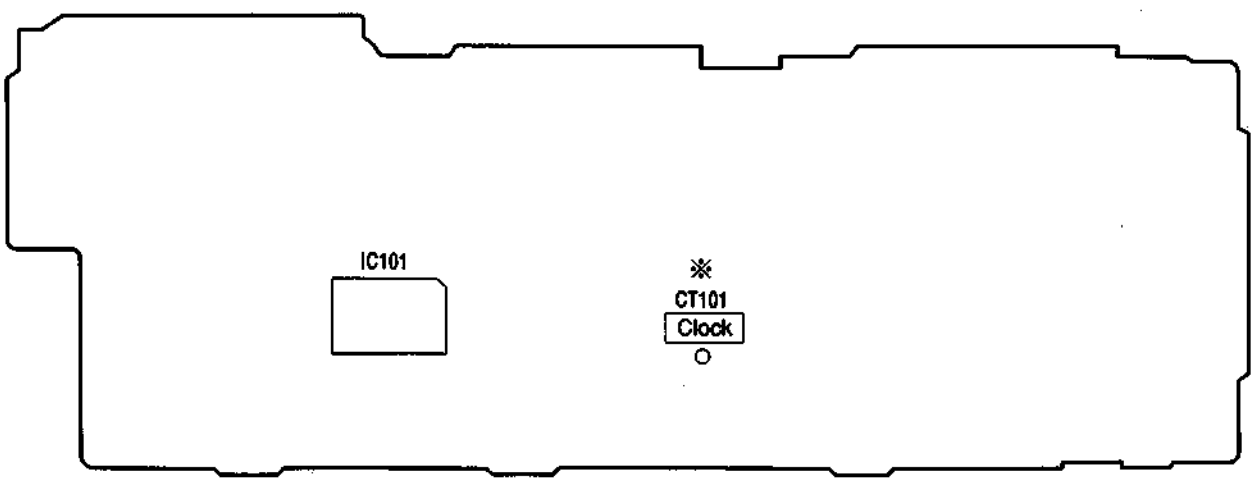
SR-600 BOARD(CONDUCTOR SIDE)



MA-150 BOARD (CONDUCTOR SIDE)

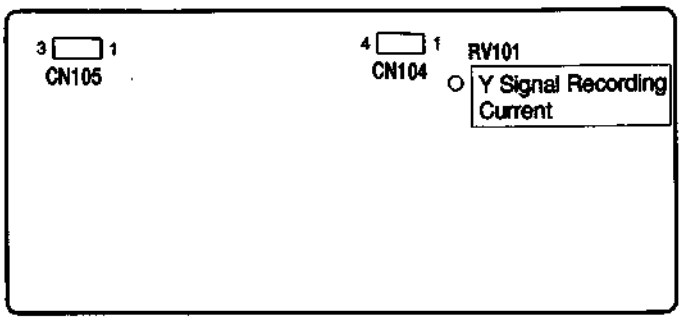


MF-176 BOARD (CONDUCTOR SIDE)

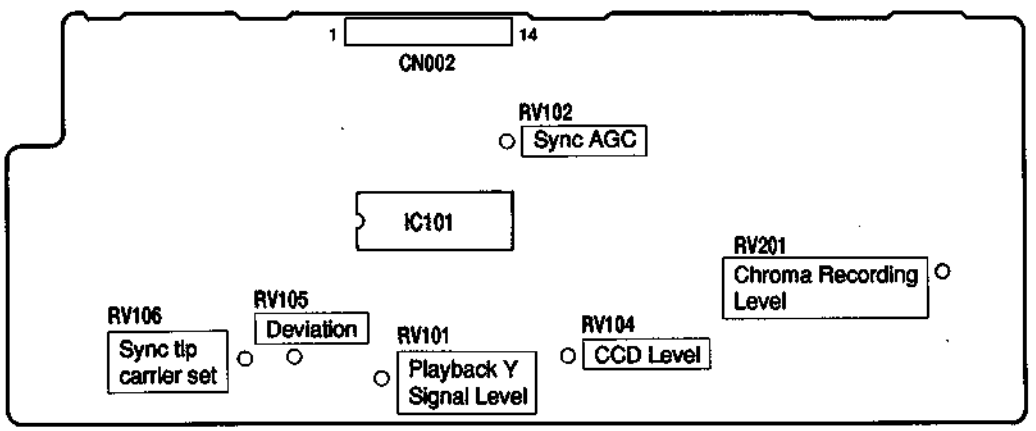


The element ※ marked should be adjusted from the component side.

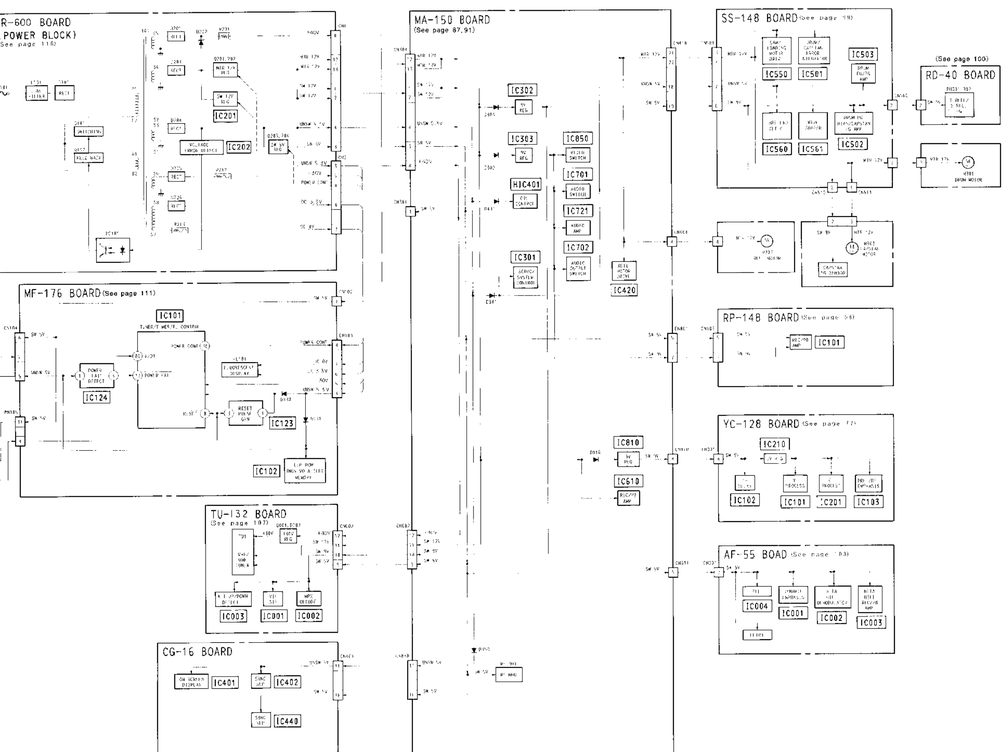
RP-148 BOARD (COMPONENT SIDE)



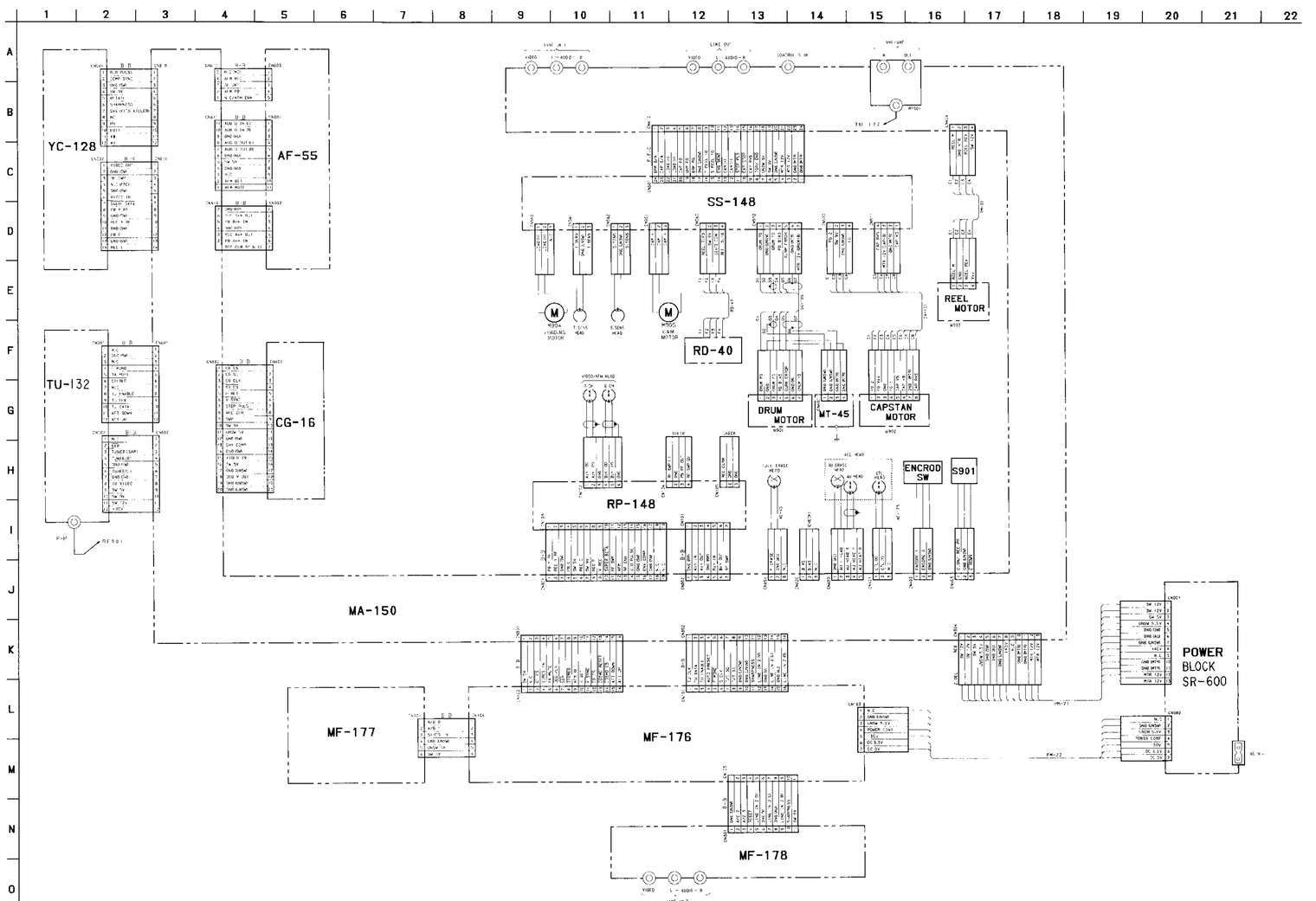
YC-128 BOARD (COMPONENT SIDE)



DIAGRAM



4-1. FRAME SCHEMATIC DIAGRAM



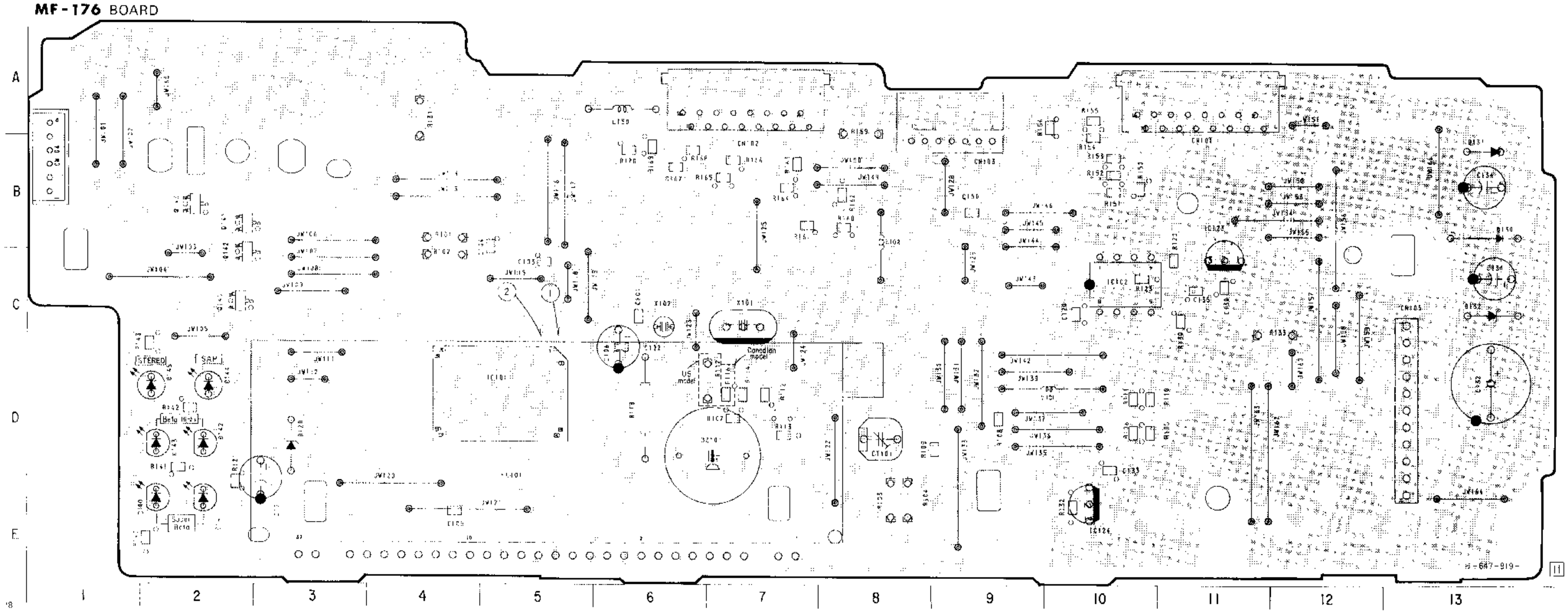
MF-176 (TIMER/TUNER/FL CONTROL), MF-177 (FUNCTION SWITCH), MF-178 (VIDEO/AUDIO/ IN/OUT) PRINTED WIRING BOARDS

Ref. No. MF 176 BOARD : 3,000 MF-177, MF-178 BOARDS : 1,000 series

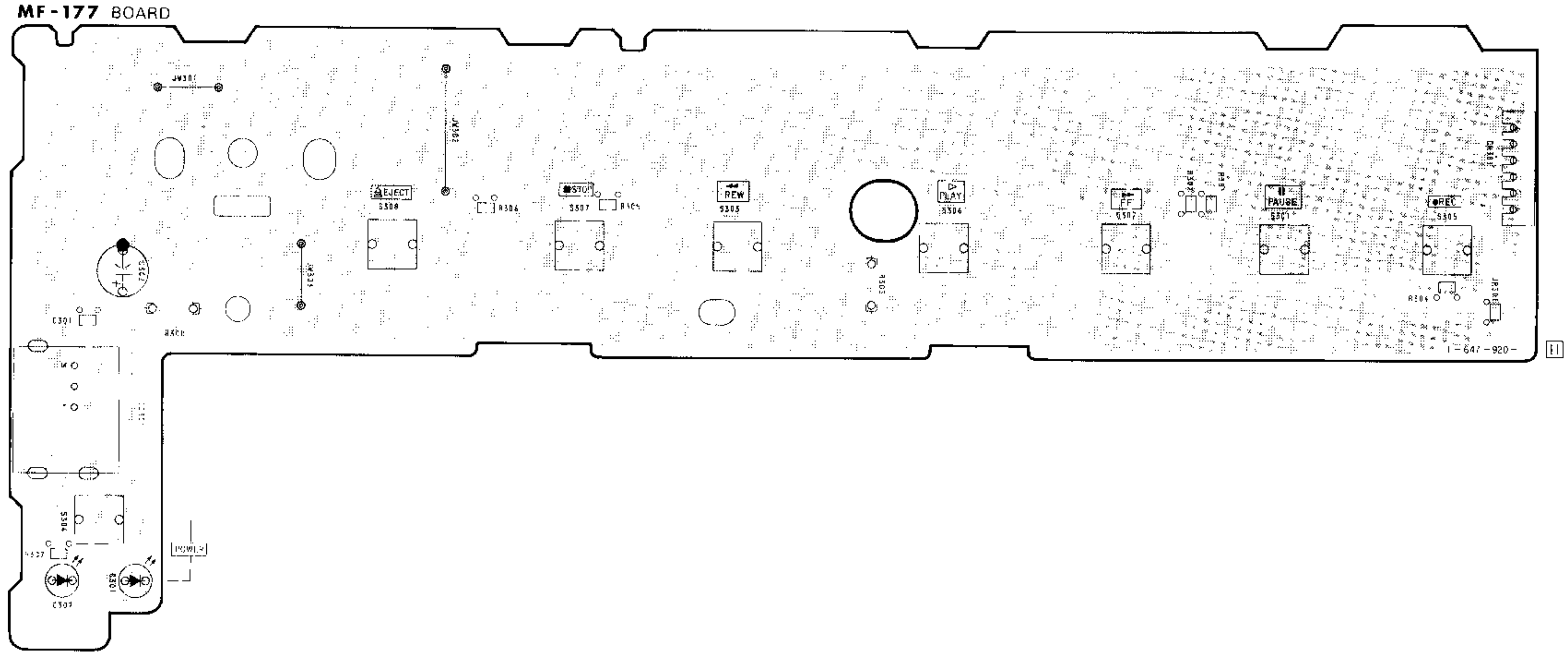
IF-176 BOARD

N101	A-11
N102	A-7
N103	A-9
N104	B-1
N105	D-13
120	D-3
130	B-13
131	A-13
132	C-13
140	E-2
141	E-2
142	D-2
143	D-2
144	D-2
145	D-2
C101	D-5
C102	C-10
C123	C-11
C124	E-10
140	C-2
141	B-2
142	B-2
143	B-2

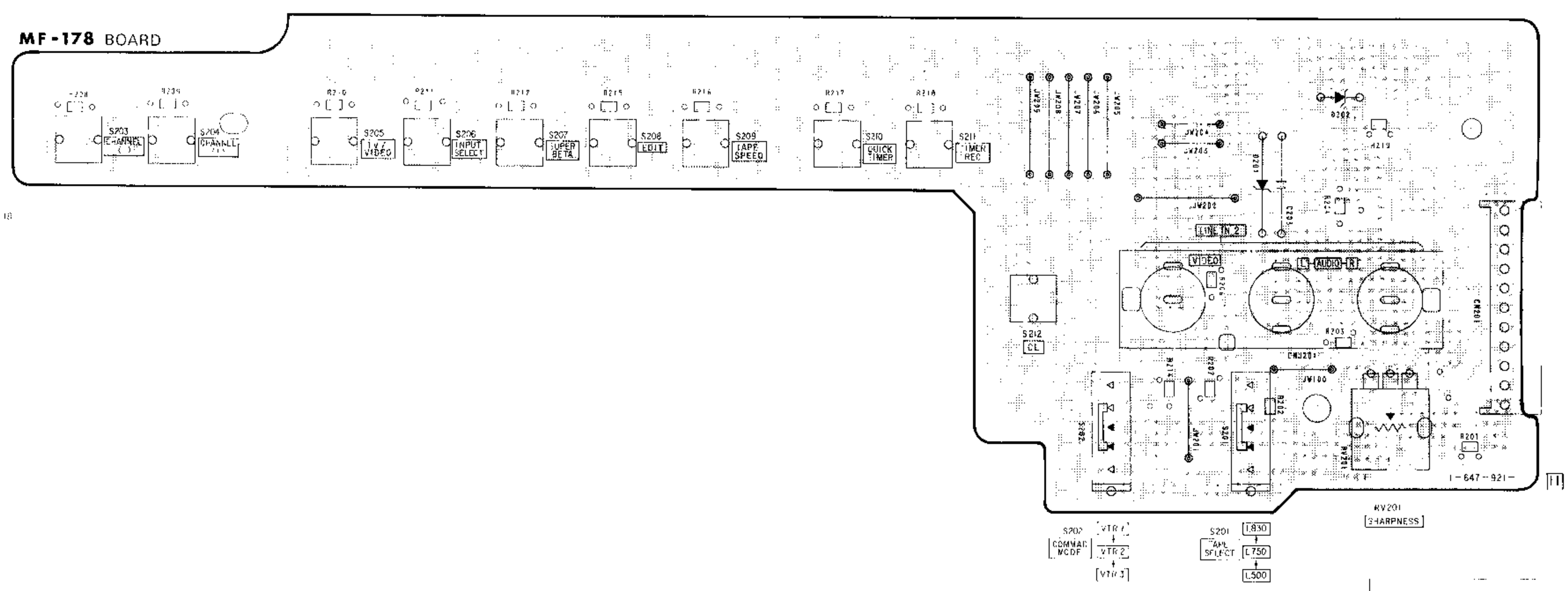
MF-176 BOARD



MF-177 BOARD



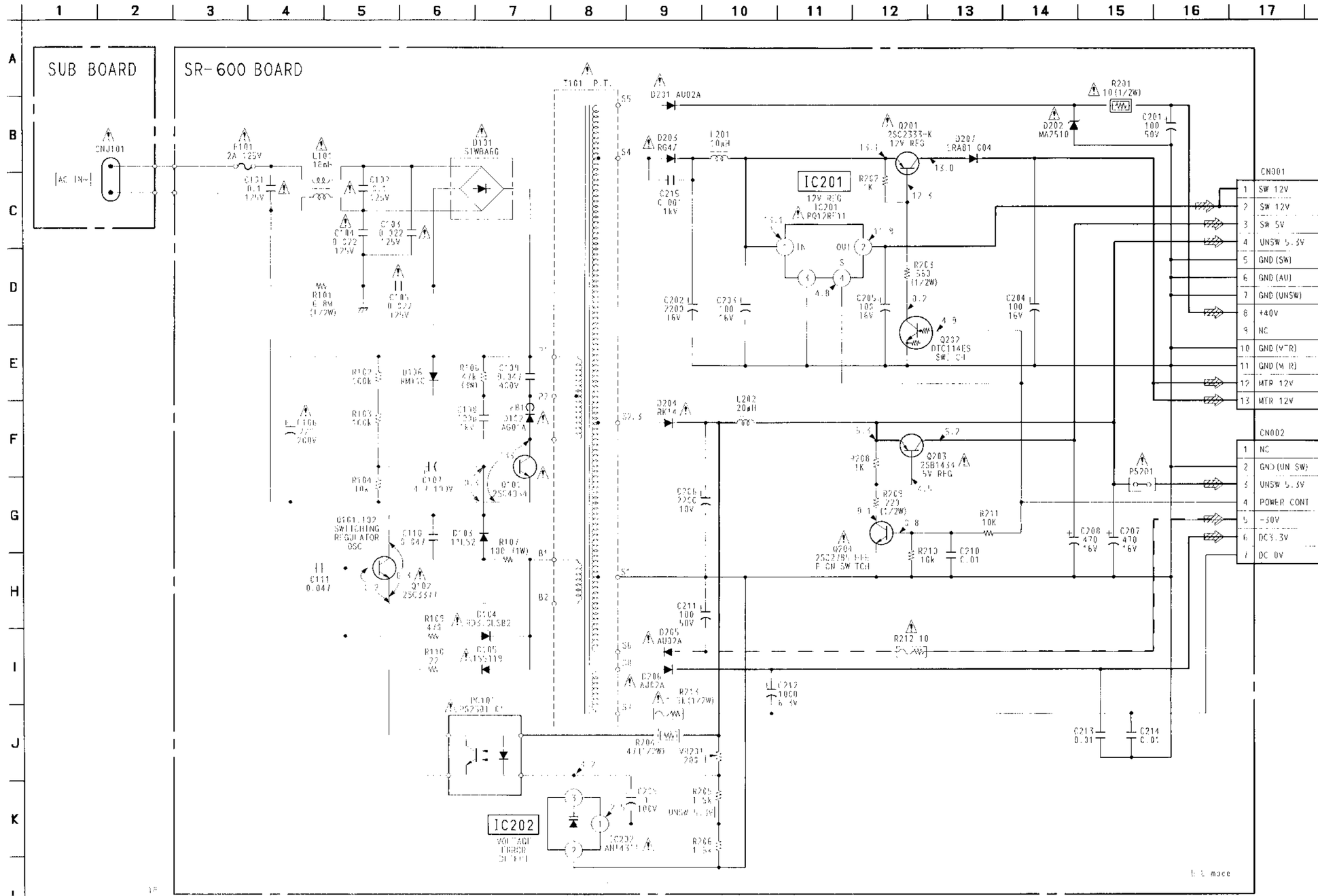
MF-178 BOARD



SL-HF2000

SR-600 (POWER) SCHEMATIC DIAGRAM

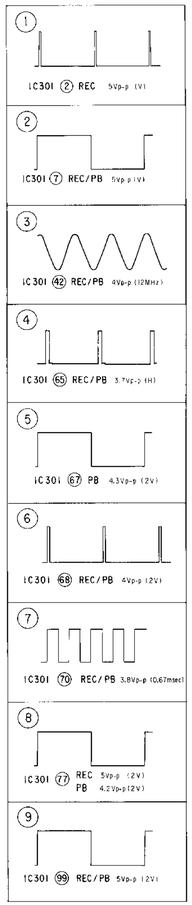
Ref. No. SR-600 BOARD : 6,000 series



MA-150 (1/2) (SERVO (1), SYSTEM CONTROL, NORMAL AUDIO) SCHEMATIC DIAGRAM

—Ref. No. MA-150 (1/2) BOARD : 9,000 series—

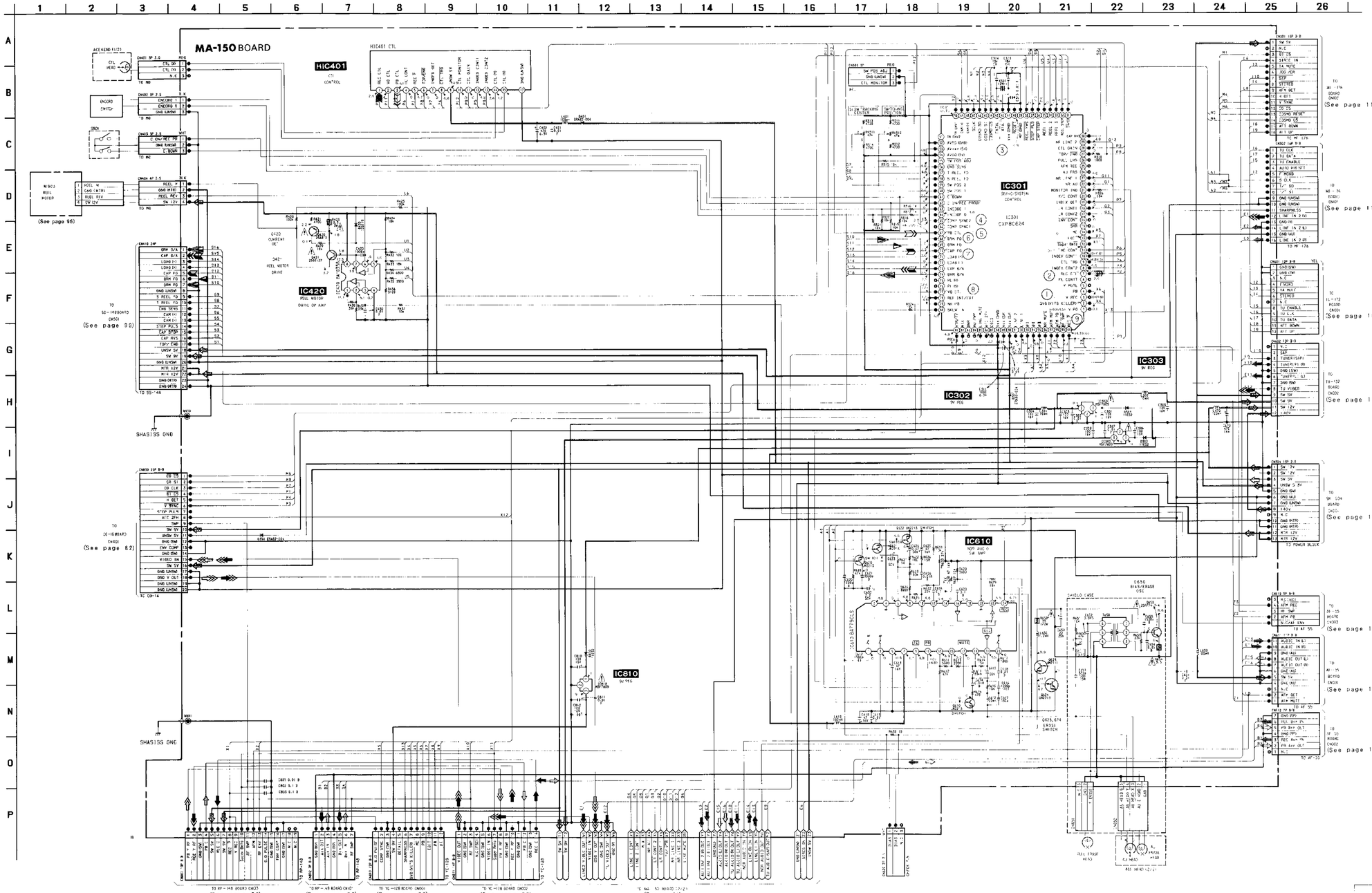
MA-150 BOARD



·SIGNAL PATH

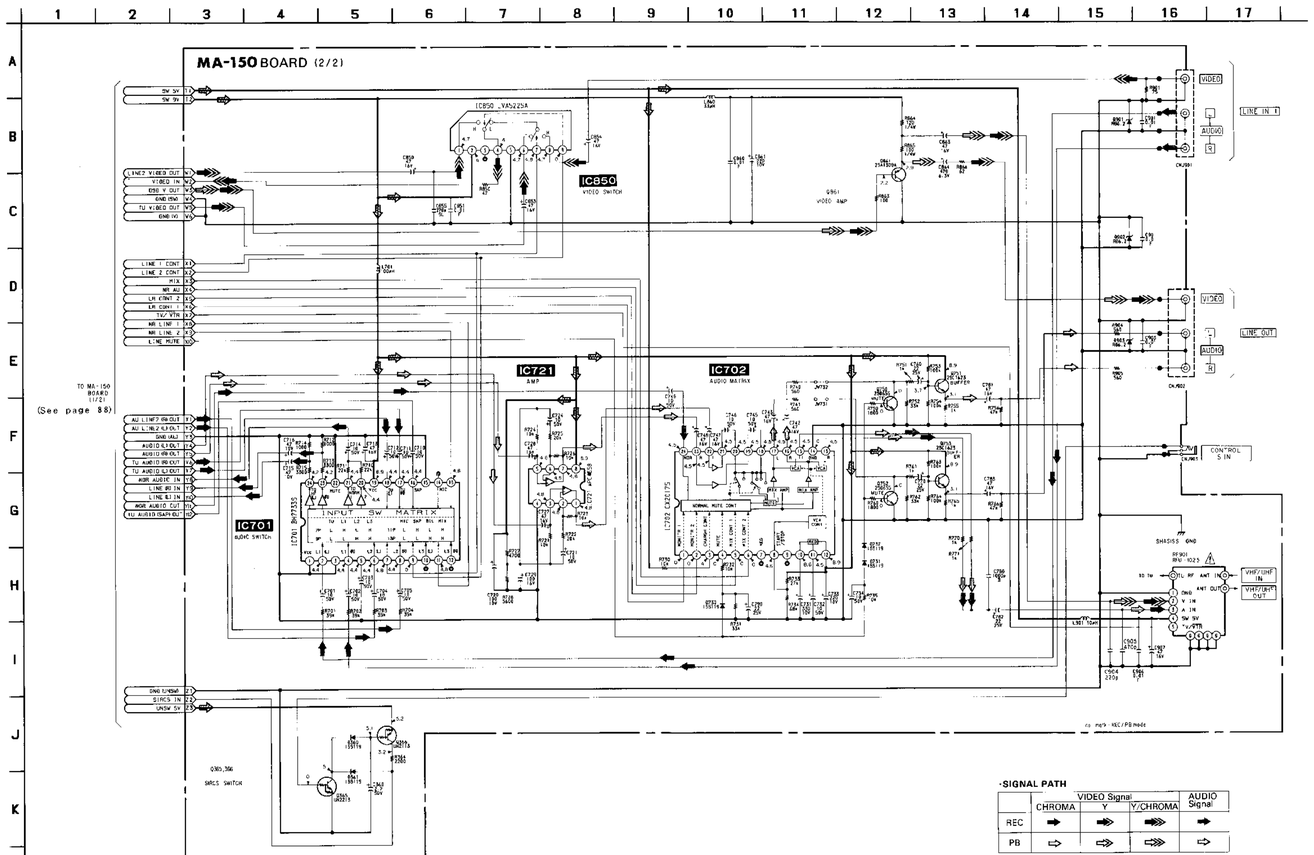
	VIDEO Signal			AUDIO Signal
	CHROMA	Y	Y/CHROMA	
REC			➡	➡
PB			⇨	⇨

	REC	REC/PB	PB
Drum speed servo		▶	
Drum pilase serbo		▶	
Drum servo (speed and phase)		▶	
Capstan speed servo		▶	
Capstan phase servo		▶	
Capstan servo (speed and phase)		▶	
Ref. signal	▶		▷



MA-150 (2/2) (IN/OUT SELECTOR) SCHEMATIC DIAGRAM

—Ref. No. MA-150 (2/2) BOARD : 9,000 series

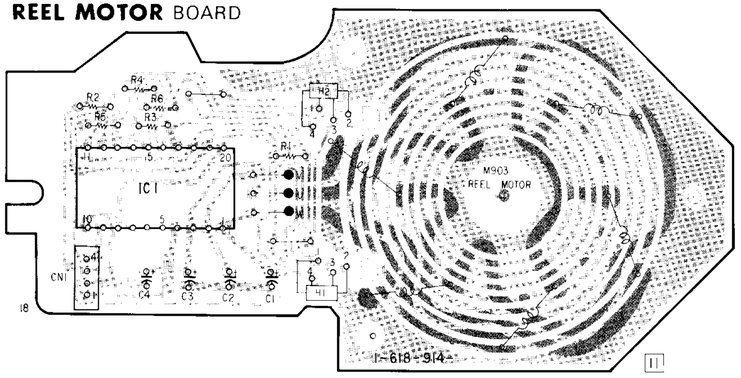


·SIGNAL PATH

	VIDEO Signal			AUDIO Signal
	CHROMA	Y	Y/CHROMA	
REC	➡	➡	➡	➡
PB	⇨	⇨	⇨	⇨

REEL MOTOR (REEL MOTOR) PRINTED WIRING BOARD

Ref. No. REEL MOTOR BOARD : 4,000 series



4-2. PRINTED WIRING BOARDS AND SCHEMATIC DIAGRAMS

THIS NOTE IS COMMON FOR PRINTED WIRING BOARDS AND SCHEMATIC DIAGRAMS.
(In addition to this , the necessary note is printed in each block.)

- **For printed wiring boards.**
- ○— : indicated a lead wire mounted on the component side.
- —— : indicated a lead wire mounted on the conductor side.
- : Pattern from the side which enables seeing.
- : Pattern of the rear side.
- Circled numbers refer to waveforms.

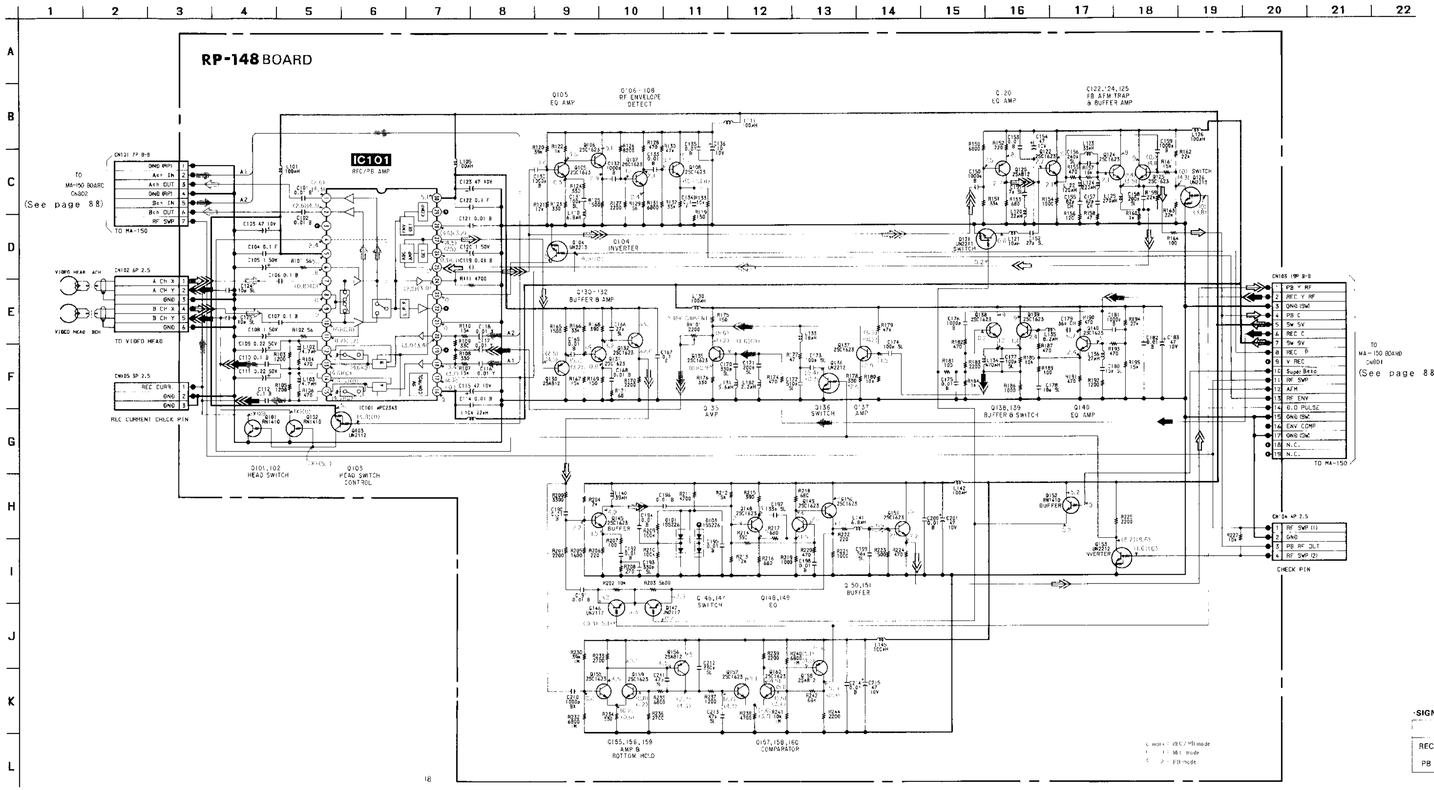
- **For schematic diagrams.**
- Caution when replacing chip parts.
  New parts must be attached after removal of chip.
  Be careful not to heat the minute side of tantalum capacitor, because it is damaged by the heat.
- All resistors are in ohms, 1/4W unless otherwise noted.
  Chip resistor are 1/10W unless otherwise noted.
  kΩ : 1000Ω , MΩ : 1000kΩ .
- All capacitors are in μF unless otherwise noted. pF: μμF.
  50V or less are not indicated except for electrolytics and tantalums.
- All variable and adjustable resistors have characteristic curve B, unless otherwise noted.
- : nonflammable resistor.
- : fusible resistor.
- : panel designation.
- △ : internal component.
- : adjustment for repair.
- —— : B+ Line.
- - - - : B- Line.
- : IN/OUT direction of (+) B LINE
- Circled numbers refer to waveforms.
- Voltages are dc between ground and measurement points.
- Readings are taken with a color-bar signal input.
- Readings are taken with a digital multimeter (DC10MΩ).
- Voltages are taken with a VOM (input impedance 10MΩ).
- Voltage variations may be noted due to normal production tolerances.

Note: The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safty. Replace only with part number specified.	**Note:** Les composants identifiés par une marque ⚠ sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

When indicating parts by reference number, please include the board name.

RP-148 (HEAD AMPLIFIER) SCHEMATIC DIAGRAM

Ref. No. RP-148 BOARD : 5,000 series



SIGNAL PATH

	VIDEO Signal			AUDIO Signal
	CHROMA	Y	Y/CHROMA	
REC	➡	➡	➡	➡
PB	⇦	⇦	⇦	⇦

English
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